EIS-ID-73-0422-F

U.S.D.A. FOREST SERVICE ENVIRONMENTAL

STATEMENT

HERBICIDE CONTROL OF SAGEBRUSH AND WYETHIA IN IDAHO

Final Statement

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Prepared in Accordance with
Section 102(2) (C) of P.L. 91-190

Intermountain Region

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NTIS SUMMARY SHEET

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

EIS 730422 F

I	Report Number	-	USDA-FS-FES (Adm) 73-29
II	Title	-	USDA Final Environmental Statement on Herbicide Control of Sagebrush and Wyethia in Idaho
III	Responsible Official	-	Regional Forester, Vern Hamre
IV	Date Filed with CEQ	-	March 8, 1973
V	Prepared by	-	U. S. Department of Agriculture Forest Service - Intermountain Region Federal Building. Ogden, Utah 84401

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UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

REPLY TO: 1940 Environmental Statements

MAR 8 1973

SUBJECT: USDA Final Environmental Statement on
Herbicide Control of Sagebrush and Wyethia in Idaho

TO: Honorable Russel E. Train, Chairman
Council on Environmental Quality

THROUGH: T. C. Byerly, Coordinator of
Environmental Quality Activities

Enclosed are ten copies of the final environmental statement on Herbicide Control of Sagebrush and Wyethia in Idaho issued by the Forest Service Regional Forester, Intermountain Region. One copy is for submittal to National Technical Information Service.

The responsible official is Regional Forester Vern Hamre, 324 - 25th Street, Ogden, Utah 84401

Philip L. Thornton
Deputy Chief, Forest Service

Enclosure

U.S.D.A. FOREST SERVICE ENVIRONMENTAL STATEMENT

HERBICIDE CONTROL OF SAGEBRUSH AND

WYETHIA IN IDAHO

Final Statement

Prepared in Accordance with
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FEB 1973

Intermountain Region

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HERBICIDE CONTROL OF SAGEBRUSH AND WYETHIA IN IDAHO

Prepared in Accordance with
Section 102(2)(C) of P.L. 91-190

Summary Sheet

I. Draft ( ) Final (X)

II. Name of Agency: Intermountain Region, Forest Service, USDA

III. Administrative (X) Legislative ( )

IV. Description of Action

This statement applies to National Forest and National Grassland areas administered by the Intermountain Region of the Forest Service, U.S. Department of Agriculture, in that part of southern Idaho lying south of the Salmon River. It covers the practice of applying the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) to approximately 15,000 acres each year of land covered by dense stands of sagebrush and wyethia.

V. Environmental Impacts

The proposal will have a limited impact on the environment by reducing the density of susceptible plant species. Research shows that a minor amount of chemical may find its way to water supplies and to the soil. This contamination is short lived. The risk of serious adverse effects is negligible due to careful planning, application, and supervision. The chemicals used are registered for such use by the Environmental Protection Agency and U.S. Department of Agriculture.

VI. Alternatives Considered

Alternatives considered and often used are: burning, chaining, plowing, different chemicals and formulations, biological control, intensive land management, and no action at all.

VII. Consultation With Others

A. General

Ninety-six copies of the draft environmental statement were mailed out for comment. In addition, a notice of the availability of the statement was sent to fifty-nine newspapers with distribution in Idaho. Thirty-six written responses were received. A

large number of groups and individuals have been verbally contacted regarding this proposal. The draft statement contained a partial list of contacts made by various Forest Service officers.

B. Agencies, Groups, and Individuals Responding to the Draft Statement and Others to Whom the Final Statement Will be Sent

1. Federal Agencies

Mr. William M. Hoffman — 3 copies
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Environmental Protection Agency
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Mr. James L. Agee
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Seattle, Washington 98101

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VIII. Date Draft Environmental Statement Made Available to Council on Environmental Quality: October 27, 1972, and to the Public: November 8, 1972.

Date Final Environmental Statement made Available to Council on Environmental Quality: MAR 8 1973

U.S.D.A. FOREST SERVICE ENVIRONMENTAL STATEMENT

Herbicide Control of Sagebrush and Wyethia in Idaho

Prepared in Accordance with
Section 102(2)(C) of P.L. 91-190

Type of Statement: Final

Date of Transmission to CEQ: MAR 8 1973

Type of Action: Administrative

Responsible Official: Regional Forester Vern Hamre
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USDA FOREST SERVICE ENVIRONMENTAL STATEMENT
Herbicide Control of Sagebrush and Wyethia in Southern Idaho

Prepared in Accordance with
Section 102(2)(c) of P.L. 91-190

INTRODUCTION

The National Environmental Policy Act of 1969, and guidelines issued by the Council on Environmental Quality in 1971, require preparation of environmental statements on major Federal actions or the accumulation of actions which may significantly affect the quality of the human environment. Statements are also required for actions which are likely to be highly controversial as is the use of herbicides. National Forests in Idaho have for many years used various methods of manipulating the composition of vegetation where an imbalance has occurred. This environmental statement is prepared to describe the accumulation of impacts or potential impacts resulting from the use of a light application of 2,4-D on many small projects over a period of several years. In recent years, the use of pesticides has become controversial.

This environmental statement covers the use of 2,4-D on selected areas of approximately 15,000 acres each year, where approximately 20 years of experience has shown that other alternatives are either more expensive or less effective in meeting the land management objectives. It does not deal with individual projects However, each individual project is studied and evaluated on its own merits, and an environmental analysis report is prepared.

I. DESCRIPTION

This statement applies to National Forest and National Grassland areas administered by the Intermountain Region of the Forest Service, U.S. Department of Agriculture, in that part of southern Idaho lying south of the Salmon River - Figure 1. Vegetative type modification through the use of the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) has been a major practice throughout the West in the past 20 years. This chemical is registered with the Environmental Protection Agency and approved for this use. Each year the program is reviewed by the Federal Working Group on Pesticides from the standpoint of safety and hazard to human health, to livestock, crops, to fish and wildlife, and to other elements of the environment.

The effect of a properly applied herbicide treatment, along with proper grazing management, reduces competition from sagebrush and wyethia permitting other native species and seeded species to reach full production. This provides the variety of vegetation under which hydrologic conditions and soil forage productivity is enhanced and can become more productive in terms of quality and quantity of the vegetation. With careful planning and consideration for all aspects of vegetation manipulation, range type modification can be compatible with other resource values. To assure harmony, it is necessary to know how herbicide treatment affects the environment.

A. DEFINITIONS USED IN THE STATEMENT

1. Spray Area: Same as "treated area" or the specific area where herbicide is placed.

2. Project Area: The planned area for plant control within which the spray areas are finally laid out.

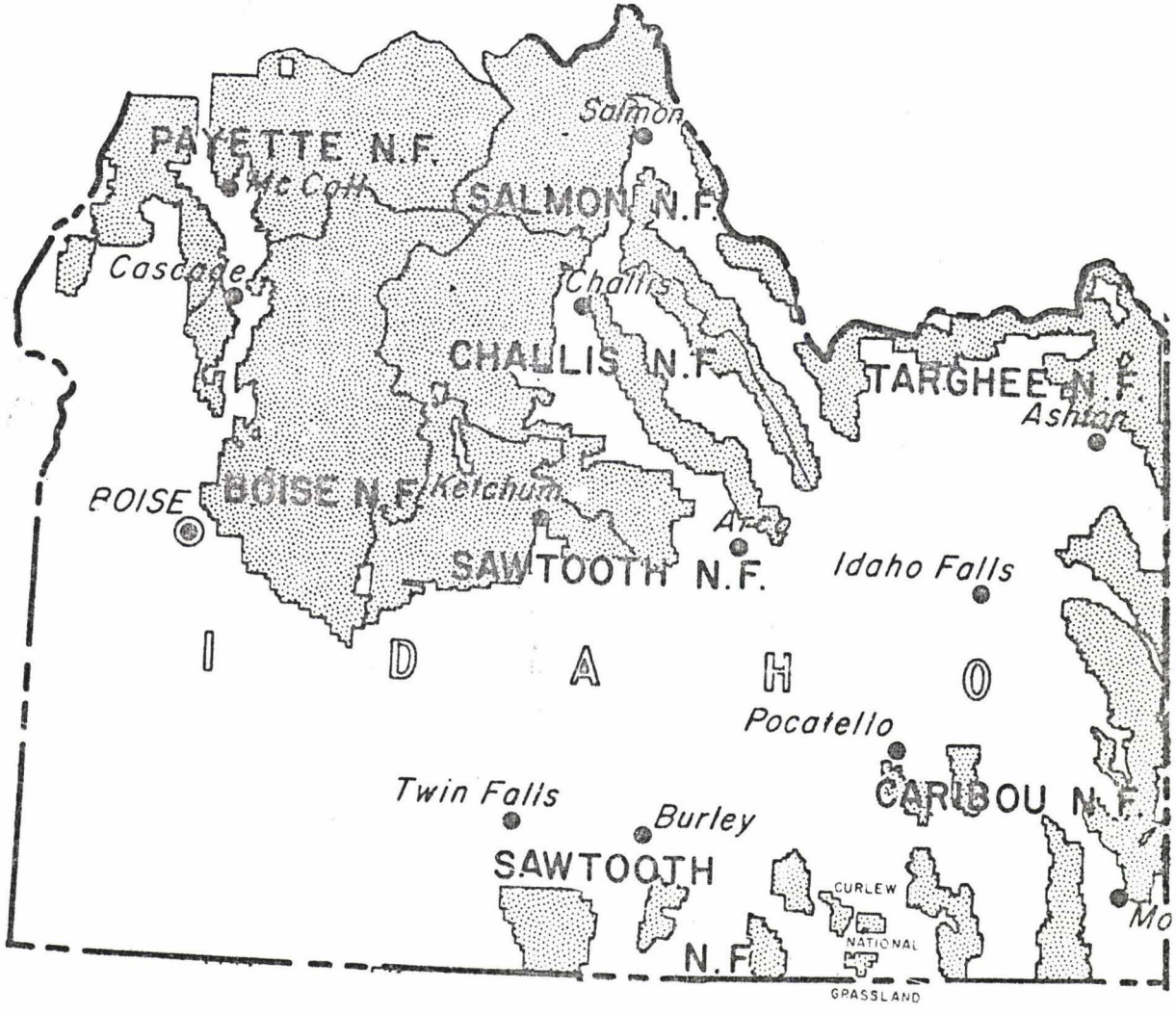
3. Program Area: A large land area where spray operations are planned. This may be a major drainage or other area which includes lands of other ownership. The program area will usually contain all of the seasonal ranges of wildlife species that are in some way dependent on sagebrush.

4. Herbicide Program: For the purpose of this statement the herbicide program is the application of 2,4-D to reduce the density of sagebrush and wyethia.

5. Target Species: The target species are shrubs of the genus Artemisia with species and subspecies of A. tridentata, A. cana, A. longiloba, A. tripartita, and in rare cases, A. arbuscula. The major target forb is dense patches of Wyethia amplexicaulis. Dense patches of this species make up less than 5 percent of the total acreage treated. Wyethia helanthoides is, on rare occasions, a target species.

FIGURE NO. 1

National Forests and National Grassland,
Intermountain Region in the state of Idaho.



B. PURPOSE

The purpose of applying 2,4-D herbicide to dense stands of sagebrush and wyethia is to break up near pure stands or stands strongly dominated by these plants, caused by past disturbances and improper grazing practices, in order that a more diversified and desirable variety of plant species may again become established and productive.

Before immigrant settlement, the western range was used only by wild animals and birds (61). Early explorers reported animals in great numbers in some areas. It is believed that wild and Indian horses were present in large numbers in some areas after about 1700. Despite large animal numbers and natural catastrophies such as extended drought cycles and fire, the range was able to maintain itself, except perhaps for localized areas where animals congregated. With settlement of the West came large numbers of domestic livestock. Without scientific knowledge of range management, improper grazing practices coupled with drought periods soon disrupted the native plant communities. Stable plant communities were broken up and desirable forage and soil stabilizing plants were replaced by less desirable plants. A considerable amount of soil was left poorly vegetated and subject to erosion.

As the ranges deteriorated, and submarginal farmland was abandoned, gullies developed, meadows often dried up, and plants such as sagebrush and wyethia increased to dominate the stands. Plant communities dominated by one species are more subject to catastrophic occurrences. A complex mixture of species provides buffers against the impacts of disease, insects, grazing, fire, drought, and other natural or unnatural impacts.

C. ORIGIN OF THE PROPOSAL

Herbicide project planning is initiated by the District Forest Ranger. Planning is preceded by a detailed soil and vegetation inventory on the project area (60). The project is most often a part of a grazing allotment management plan, but may be applied as part of a wildlife habitat or watershed improvement plan. During the planning stage, usually a period of several years, a detailed environmental analysis is made (60). This analysis evaluates the impact of spraying on the project area and the cumulative impact of other nearby herbicide projects until the entire program area is evaluated. Evaluation does not end with an analysis report but continues through an extended period of time.

The District Ranger develops his plans using the expertise of specialists in ecology, biology, soil science, hydrology, landscape architecture, range science, and other sciences as the need is recognized. Frequently advice is obtained from specialists in other agencies and universities. The services of state wildlife biologists have helped considerably in analysis of effects on wildlife habitat.

D. ECOLOGICAL SYSTEMS

1. Target Vegetation: The sagebrush ecosystem is one of the largest range types on the western range. In 1936 the Forest Service estimated this ecosystem to occupy 96.5 million acres (61). In 1970 the Forest Service developed the "Forest Range Environmental Study" (FRES). This data bank of information was contributed to by several state and Federal agencies and is considered rather accurate. The FRES data shows 94.2 million acres in the sagebrush ecosystem. The difference between the two estimates is considered to be a result of better mapping and inventory procedures and not a significant change in acreage.

a. Sagebrush. The total area dominated by sagebrush-grass vegetation types in the Intermountain Region today has not materially changed since pioneer days (59). Exceptions include acreage converted to intensive agriculture, and areas invaded by sagebrush due to changes in the environment, such as in former meadows where the water table has been lowered through stream channel head cutting (53). However, the understory of grasses and forbs has been seriously depleted and because of the dominant position of sagebrush, the herbaceous understory may not recover for a long time without reducing the sagebrush competition. Thus, the concern is not with a change in acreage of sagebrush, but with the imbalance of plant composition within the sagebrush-grass ecosystem.

The original status of sagebrush or its natural state today is a subject of considerable debate. In order to evaluate management of the sagebrush-grass type, one must have a working knowledge of site potentials and natural makeup of plant composition in the various plant communities. By analysis of relict areas and areas with a known history of light use, one can develop this knowledge. It is far beyond the scope of this statement to describe the sagebrush ecosystem in detail. For additional information the reader is encouraged to review papers on this subject (7, 48, 56, 57, 66). The summary and conclusions of the 1962 paper by Passey and Hugie are presented here for the benefit of the reader that does not wish to research further (48). It should be pointed out that this paper does not separate the subspecies of Artemisia tridentata.

> Vegetation and soils were studied on 66 pristine or long-protected areas of relict native rangeland on foothills and plains of southern Idaho, northern Utah and northeastern Nevada. Qualitative and quantitative values of five species of sagebrush on these locations and their relationship to great soil groups were reported.
>
> One or more species of sagebrush occurred on 64 of the 66 study locations. Sagebrush was present on all zonal Sierozem, Brown and Chestnut soils, on all intrazonal Calcisols, Planosols and Solodized Solonetz, and on all azonal Lithosols, but did not occur on either of the zonal Prairie soils included in the studies. Species dominance, number, age,

herbage production and percent of total herbage production of sagebrush varied within and between great soil groups.

Sagebrush stands were uneven-aged but were dominated by mature plants. Stands dominated by big sagebrush were open and plants were unevenly distributed to form sagebrush savannas. Plants were more closely and more uniformly spaced in stands dominated by threetip, black, low and alkali sagebrush than on stands dominated by big sagebrush.

Big sagebrush occurred more frequently and on a greater variety of soils than did any other sagebrush species. Alkali sagebrush appeared to be the most specific of any species in soil requirements and occurred in dominance only on slightly acid to slightly alkaline Planosols.

Sagebrush produced from 47 to 322 pounds of air-dry herbage and contributed from 9 to 50 percent of total herbage production on these soils where it occurred. The number of sagebrush plants per 1000 square feet of area ranged from 28 to 480.

The oldest big sagebrush plants grew on the driest soils. Size and age of big sagebrush were unrelated.

Even on lands protected from grazing use, the amount and species of sagebrush within a stand may fluctuate because of the influence of insects, disease, fire or climatic factors.

The studies indicated that sagebrush may be a component of the climax or potential native plant community on many of the soils within the area of study.

The data presented will be useful in the technical description of range sites represented by the relicts and, through interpolation and extrapolation of these data, the place of sagebrush in potential native plant communities may be approximated for range sites not represented by suitable relict areas. These data also have value as a basis for planning sagebrush control measures on rangelands.

The sagebrush-grass type may be subdivided into two broad catagories, big sagebrush and low sagebrush. Within each group there are species, subspecies, and forms which differ greatly in the kinds of environments they occupy, their palatability to livestock and wildlife, their reaction to grazing by livestock and wildlife, and their susceptibility and reaction to chemical treatments.

(1) The Low Sagebrush Group. The low sagebrush group is made up of black sagebrush (Artemisia nova); low sagebrush (Artemisia

arbuscula ssp. arbuscula and Artemisia arbuscula ssp. thermopola); and alkali sagebrush (Artemisia longiloba).

(a) Black Sagebrush. This species normally occupies sites of low productive potential. It is moderately palatable for livestock and highly palatable for some wildlife species; consequently, it often decreases with heavy grazing. Because of the productive limitations of its environment and its high forage value, black sagebrush is not a target for chemical treatment.

(b) Low Sagebrush. The bulk of the low growing form of sagebrush found in the Intermountain Region is one of the two subspecies of A. arbuscula. The subspecies arbuscula is the low elevation form commonly occurring below 7,000 feet in elevation. The subspecies thermopola is the high elevation form commonly occurring 7,000 feet or above in elevation. In cold mountain valleys, the thermopola subspecies may occur at low elevations. Both species occupy sites where moisture is sufficient to saturate the soil during some period of the year and prolonged dry conditions exist during other times. This condition may be produced by an impermeable soil horizon, shallow rocky soils, water table fluctuations, or periods of prolonged drought.

(c) Alkali Sagebrush. This species resembles A. arbuscula ssp. arbuscula, but flowers much earlier in the year. Alkali sagebrush occurs at intermediate elevations overlapping the ranges of the two arbuscula subspecies. It has somewhat the same habitat requirements but often occurs on soils which have more productive capability than soils on sites occupied by the other two subspecies.

These latter three low sagebrush forms are occasionally sprayed, but the response of the associated species is variable depending on the soil capability. Sites occupied by alkali sagebrush are more capable of production and responding favorably to treatment, but good results have also been obtained from spraying sites dominated by the two arbuscula subspecies as well.

Sites currently occupied by the low sagebrush groups are often important range areas for big game and sage grouse. Each site is evaluated on its own merits prior to any proposed chemical control project. Sites critical to the welfare of wildlife are not sprayed.

(2) The Big Sagebrush Group. There are four major subspecies and forms of Artemisia tridentata (big sagebrush) that occupy extensive acreage in the Intermountain Region - basin big sagebrush (Artemisia tridentata ssp. tridentata; Wyoming big sagebrush (A. tridentata ssp. wyomingensis); mountain big sagebrush (A. tridentata ssp. vaseyana) and subalpine big sagebrush (A. tridentata ssp. vaseyana form spiciformis). There are several other species and subspecies of big sagebrush that may be the target of spray operations. Only two of them occupy any large acreage in the Intermountain Region - mountain silver sagebrush (Artemisia cana ssp. viscidula) and threetip sagebrush

(A. tripartita). Each of the above mentioned subspecies has unique environmental requirements, unique combinations of associated species, and each reacts differently to grazing pressure and chemical treatment.

(a) Basin Big Sagebrush. This subspecies grows on deep well drained soils in valley bottoms and lower foothill regions. Much of its former range is now agricultural lands. Basin big sagebrush is a prime invader into meadows in valley bottoms at lower elevations. It invades these meadows following an alteration in the meadow environment through stream channel cutting and lowering of the water table. This subspecies is the least palatable of the sagebrush groups to both livestock and wildlife. It tends to increase in density and canopy coverage after spraying even when proper grazing practices are employed. Basin big sagebrush is one of the major target species for chemical control and may require additional control treatment in some areas.

(b) Wyoming Big Sagebrush. This subspecies grows in the hotter and drier portions of the Intermountain Region usually at intermediate elevations and below. It grows commonly on calcareous soils that are usually shallower than soils found on sites occupied by basin big sagebrush. Wyoming big sagebrush is considered to be the most palatable subspecies of the big sagebrush group for both livestock and wildlife. It tends to increase in density and crown cover after spraying until it reaches a density of approximately 30 percent.

This density will vary depending on site variations. With proper grazing practices, this subspecies is not expected to require respraying. The site capability of areas occupied by this subspecies is relatively low, and the response of associated species following spraying is moderate to low. Because of its low site capability and relative palatability, Wyoming big sagebrush is one of the least desirable targets for spray application and is seldom sprayed.

(c) Mountain Big Sagebrush. This subspecies occupies extensive acreage on National Forest lands. It is most common at higher elevations, but may also be found in cool environments as low as approximately 4,500 feet. Mountain big sagebrush is intermediate in palatability for wildlife and low for livestock. It has increased greatly in density and crown cover with past excessively heavy cattle grazing pressure. It is a prime invader of meadows in valley bottoms at higher elevations following an alteration of the environment of these meadows through stream channel cutting and a lowering of the water table. Mountain big sagebrush is an aggressive plant and a major target of spray operations because it has increased in density on the highly productive sites with which it is generally associated. With proper grazing practices after initial spray treatment, there are indications that some sites may and other sites may not require further treatment in subsequent years.

(d) Subalpine Big Sagebrush. This is the high elevation form of mountain big sagebrush and has most of the same characteristics. Because of the high elevation and the short growing season the response of the associated species to spraying is low. For this reason these sites are seldom sprayed.

(e) Mountain Silver Sagebrush. This species is a valley bottom species associated with meadows at elevations of about 7,000 feet or above. This is a moderately palatable species for both sheep and wildlife, particularly during the winter months. Under normal spray applications it tends to sprout vigorously within a few years after spraying, and special procedures are necessary to control it.

(f) Threetip Sagebrush. In some areas this species occupies a narrow ecological band between areas dominated by Wyoming big sagebrush and mountain big sagebrush. It is a relatively palatable species for wildlife. It tends to root sprout or establish from residual seed after spraying and may soon become as dense on the site as it was prior to spray application. For this reason this species is not a desirable target for spray application in most instances.

b. Wyethia. There are two species of wyethia in the Intermountain Region that tend to increase and become a management problem Wyethia amplexicaulis (mulesears wyethia) and W. helianthoides (whitehead wyethia). Mulesears is common throughout the Region, while whitehead wyethia is found only in certain areas.

(1) Mulesears Wyethia. Mulesears wyethia is a species of moist situations on hillsides and dry meadows, and is often associated with heavy soils within the sagebrush-grass types. It has increased with past heavy grazing, particularly by cattle, and forms almost pure stands.

(2) Whitehead Wyethia. Whitehead wyethia occurs on the more moist sites, particularly meadows. It has increased under past heavy cattle grazing pressure, and also forms almost pure stands in these situations.

Both species are low in palatability to cattle and only slightly better for sheep and big game. Occasionally blue grouse will nest where wyethia is growing. Dense stands of both species are often targets for spray applications, particularly mulesears which is more extensive and common on rangelands. During its early stages of growth, wyethia is readily eaten by deer and elk. Therefore, its importance as spring forage for big game must be taken into consideration while planning control measures.

2. Affected Birds and Mammals.

a. Birds.

(1) Sage Grouse. There are various environmental relationships that exist within the wildlife populations on a sagebrush-grassland type. The sage grouse has evolved in the sagebrush-grassland habitat and makes use of the peculiar food and cover systems provided by the various species of sagebrush and their associated species of grasses and forbs. In order to evaluate the sage grouse habitat, optimum habitat conditions must be described.

(a) Winter. During winter, nearly all of the sage grouse food and cover needs are met by sagebrush (11). Various species and densities of sagebrush are utilized depending upon the area and climate. These areas may be at high or low elevations, depending upon snow depth and its effects on available food and cover. Both big sagebrush and low sagebrush groups are utilized for food and cover requirements during the winter months. Optimum sagebrush crown canopy varies between 15 and 35 percent depending upon the site and climatic conditions.

(b) Spring and Summer. Sage grouse prefer open areas surrounded by sagebrush for strutting activities (30). During the breeding season most cocks confine themselves to a small area around their strutting grounds. All of their necessities of living must occur on these sites. Sagebrush is the primary diet of cocks during the strutting season although they also use new growth of other plants. They are dependent upon sagebrush adjacent to the strutting ground for loafing during the day. Hens use sagebrush for their primary food until more succulent food becomes available as spring advances.

The strutting ground is generally located near a suitable nesting area (44). To be most suitable for hens to nest, the area should have sagebrush of a medium height and density to provide nesting shelter (34). The height of sagebrush commonly used for nesting has been found to vary between 7 to 28 inches (18, 44, 54). Brush density preference appears to vary, but stands of about 25 percent or less canopy cover are most frequently selected (44). Average canopy density in Idaho was found to be 29 percent, with an average plant diameter of 3.3 feet based on the location of 302 nests (18). It is not clear whether the Idaho data is describing optimum conditions or actual conditions.

When the chicks hatch, they are highly dependent upon insects for food (33, 53). The optimum insect population is produced in a well balanced community of shrubs, grasses, and forbs. In most areas, sagebrush is an essential part of sage grouse brood habitat, particularly on early spring and late summer brood ranges. Scattered sagebrush with grass and forbs are utilized by broods throughout the summer for food and cover. In Montana, Wallestad found broods preferred a sagebrush crown cover of less than 25 percent with an average of 14 percent for June, 12 percent for July, 10 percent for August, and 21 percent for

September (64). In northern Nevada and southern Idaho, Phillips found the minimum to optimum sagebrush canopy requirements for summer sage grouse habitat to range between 5 and 15 percent (50). As sagebrush overstory exceeds approximately 15 percent, understory plants are suppressed and quality of the sage grouse habitat decreases (50).

As the chicks gain size and mobility, their diet shifts from insects to the buds of new leaves and flowers. During summer, chicks continue to increase the amount of vegetable food they eat, but still they require the most succulent and nutritive parts (30, 33). By summer, many grouse have been drawn into the vicinity of meadows and areas that produce succulent vegetation (53).

Where large continuous areas of dense sagebrush exist, it may be desirable to break these up by spraying narrow strips, irregular patterns, or preferably with a partial control treatment (50, 52). This will reduce the stand density to a level where sage grouse habitat is improved and succulent forage production is increased.

(c) Fall. Sage grouse dependence upon sagebrush for food increases into the fall. Grass and forbs become less necessary for food and cover after the young grouse have become fully developed and can fly a considerable distance. Succulent forbs remain in the diet as long as they are available. Dandelion, wild lettuce, alfalfa, clover, and vetches are all utilized in the diet (52).

Sage grouse have not adjusted their life processes to fit a pattern of land use, which eliminates or seriously disturbs large tracts of the sagebrush-grass types, on any of their seasonal ranges. On depleted ranges, sage grouse are dependent upon not only restoration of the grass-forb resources, but also upon restoration and preservation of some sagebrush.

(2) Sharptail grouse. Suitable habitat for sharptail grouse consists of hills or benchlands with rolling topography and slopes of less than 50 percent. The key plants for sharptail winter diet in the northern Great Basin area are buds from chokecherry, serviceberry, hawthorn, mountain mahogany, wild rose, and trees. Sunflower, wild lettuce, goatsbeard, native grasses, and grasshoppers have been observed in their summer diet. Ridgetops and knolls covered with short grass are suitable areas for dancing grounds, but they are dependent upon native grass, herbs, and shrubs nearby for feeding and roosting. Most sharptail nests are directly under or within a few feet of overhead cover. The summer brood territory consists of grasses and low shrubs. In late summer and early autumn, sharptails begin congregating into flocks of 10 to 30 birds. They occupy open cover characterized by grass, forbs, and scattered brush. As the birds develop, they tend to select the taller brush habitats. Sharptail habitat can be

sustained or improved by maintaining a high quality grassland with interspersed patches of tall brush or trees. An increasing density of sagebrush can be detrimental to sharptail grouse habitat (70).

(3) Songbirds. Songbirds frequently found nesting in sagebrush are the vesper and Brewer's sparrows. In sagebrush stands these birds have been reported to make up as high as 90 percent of the breeding pairs of songbirds (15). Other nongame birds frequently using the sagebrush-grassland type, but usually occurring in small numbers, are the western meadowlark, horned lark, lark bunting, mourning dove, and sage thrasher. Studies in Montana indicate that spraying of sagebrush has little if any effect on the number of breeding pairs of these species with the exception of the Brewer's sparrow (15, 54).

The Brewer's sparrow builds its nest off the ground, usually in shrubs. Since this bird is territorial, the number of breeding pairs would be limited by the number of territories available. On an area fully stocked with Brewer's sparrows, perhaps one pair per 3 acres, a complete kill of sagebrush would possibly cause enlargement of the territory requirement, resulting in fewer breeding pairs. This reduction in breeding pairs has been found to be as high as 50 percent two years after herbicide treatment (54).

A study now underway in Utah, where 622 acres of dense wyethia and mountain big sage were sprayed in 1972, should give additional information on the effects of songbirds, insects, and blue grouse. Preliminary information shows that there were no detrimental effects resulting from use of the 2-4-D in 1972 (5). This study is being sponsored by the Utah Cooperative Wildlife Research Unit and Utah State Division of Wildlife Resources, with the Forest Service furnishing the study area and doing the 2,4-D application work. Best, 1972, reported that strip spraying of sagebrush resulted in no notable effect on vesper or Brewer's sparrows during the first year (67).

(4) Predatory Birds. Spraying sagebrush does not appear to have any significant effect on predatory birds. Reducing sagebrush canopy may temporarily expose some prey species to greater predation from raptors. Populations of various prey species will change, with some species increasing and some decreasing (28).

b. Mammals

(1) Antelope. Antelope are often yearlong residents of the sagebrush-grassland type. Their dependency on sagebrush seems to vary with the association of plants available to them. When other species of plants are available, sagebrush tends to decrease in their diet. When there is a dominance of sagebrush and lack of other browse species, antelope depend heavily on sagebrush, especially during periods when deep snow covers other forage. During the growing season antelope switch to a diet dominated by forbs and grass. During the first few weeks after birth, fawns require low scattered shrubs for cover, and in

most cases sagebrush fills that need. "Fawning cover in Idaho is big sage occurring in draws with an average height of 2-3 feet and approximately 30 percent canopy cover" (18).

(2) Mule Deer. Deer populations are generally limited by the quality and quantity of their winter range. With few exceptions they depend heavily on sagebrush, especially species of the low sagebrush group. A range containing a wide variety of shrubs, forbs, and grasses would be considered higher quality than one containing only sagebrush with few associated forb and grass species.

Food habit studies conducted in Idaho show that mule deer tend to select a winter diet of about 40 to 45 percent sagebrush (26). When a variety of other palatable shrubs are available, the percentage of sagebrush in the diet tends to drop. As the variety of shrub species decreases, the percentage of sagebrush in the diet goes up (26).

In Colorado, captured deer tended to reject a straight diet of sagebrush and lost weight on the alfalfa-sagebrush diet, but readily consumed bitterbrush and mountain mahogany (13). Palatability ratings based on the amount of feed consumption ranked sagebrush below bitterbrush and mountain mahogany. The experimental deer lost weight when fed sagebrush but gained or maintained their weight when fed the other shrubs. Chemical analysis showed sagebrush to be highest in nutrients. However, the digestive process is likely to be slowed up materially when large quantities of sagebrush are consumed (43). Smith reported that when four does and two bucks were fed a choice of big sagebrush and black sagebrush, one doe refused to eat, one died, and two does ate so little they were removed from the test and put on more desirable feed (55). This inherent drawback in sagebrush results from its high level of volatile oils which inhibit the action of digestive bacteria found in the rumen. When sagebrush is consumed along with other plant species, this effect is lessened. Mule deer range must have several forage species available to be classed as high quality range.

In Utah, Plummer, et al, stated "The goal of game range restoration is the development of a productive stand of desirable shrubs and herbs. Where some important forage plants are present, reduction of competition by appropriate methods may be all that is necessary to achieve the desired restoration. Perhaps some change in management to lessen grazing pressure would result in an adequate stand of desired species. Occasionally, spraying with a selective herbicide may be sufficient. To accomplish satisfactory improvement without seeding, at least one desirable shrub and ten desirable herbs per 100 square feet should be present" (51).

From the above it can be seen that a large acreage of dense sagebrush is, by itself, not enough to support optimum deer and other wildlife populations. A wide variety of understory species and other shrubs is also necessary. Near pure stands of sagebrush, especially those high in volatile oils, may supply an abundance of forage but, due to the volatile oil problem and lack of variety in the diet, may not provide adequate nutrition for grazing animals. Animals consuming a high percentage of sagebrush in their diet may suffer from malnutrition. In this case, reducing the density of sagebrush and replacement with other species is highly beneficial. There are instances where grazing pressure on sagebrush by deer or antelope is heavy regardless of the range quality. In such instances, reduction of sagebrush density would be detrimental to the forage supply and would result in heavier grazing on the remaining plants, possibly to the extent of their total destruction. The latter case would be termed critical game range and is not considered for chemical treatment.

(3) Elk. Elk are less dependent upon sagebrush than are deer and antelope. Elk prefer to winter in the aspen and mountain brush zones and they migrate to the lower elevation juniper and sagebrush types only when deep snow forces them to move. When elk move to these lower zones, they frequently are in direct competition with deer for forage. As soon as snow conditions permit, elk move to higher elevations making use of new growth of grass and forbs. If available, elk tend to favor tall brush types, including sagebrush, for calving but will readily use open timber types. Sagebrush is not considered to be a desirable forage species for elk but does help to supplement their diet during periods of food shortage.

(4) Bighorn Sheep. Studies have shown that the critical winter range of bighorn sheep is usually located at elevations with low snow depths and rocky cliffs for escape habitat. Desirable bighorn ranges contain mixtures of palatable browse plants, forbs, and native grasses. Native grasses, especially bunchgrasses, are probably the most important food for bighorn sheep. Browse species are important in the winter during periods of snow cover. Other plants eaten are forbs and lichens. Bluebunch wheatgrass is the most important grass in the fall to spring diet of most Rocky Mountain Bighorn Sheep herds.

In central Idaho, Morgan's studies showed browse usage is concentrated on mahogany (40). Only rarely do they take sagebrush. Grasses make up an average of 69 percent of the bighorn's winter diet. On the Ashnola bighorn herd, Blood, employing grazed stem counts, analyses of rumen samples, and trailing feeding bighorns, determined that grasses made up an average of 72 percent of the fall to spring diet, browse 24 percent, and forbs 4 percent (9).

It appears that any management effort designed to enhance the vigor of the native grasses, especially bluebunch wheatgrass, will improve and benefit the habitat for bighorn sheep (19).

(5) Moose. Historically, moose have been associated with willow and aquatic areas. Studies within the Intermountain Region show moose inhabit spruce-fir forests, Douglas-fir forests, and various other deciduous plant habitat types as well. Moose adapt their food habits to the browse available in the various habitat types. At higher elevations low huckleberry, willow and subalpine fir are most important. At lower elevations, Douglas fir, aspen, dogwood, ceanothus, serviceberry, and chokecherry may form the bulk of the diet. Where available, single species of willow such as Salix pseudocordata is most important. The above moose habitat is not included in spray areas. It should be noted, however, that moose wander over many areas and will utilize forage found in the sagebrush-grass types (70).

E. OTHER DEMANDS

Federal programs call for agencies to assist in rural area development. States look to Federal agencies for programs and assistance to improve the economy of rural areas. There is a constant demand for increased forage for livestock and improved habitat for wildlife. There is increasing pressure from people of the metropolitan areas to use public lands.

Regardless of the intended use of rangeland, whether it be for production of usable water, forage, wildlife, recreation, esthetics, or some combination of uses, the stress on the range environment is great. To withstand these natural and unnatural demands, the vegetation must be improved and maintained in the best possible condition.

F. SOCIAL AND ENVIRONMENTAL OBJECTIVES

The most obvious economic benefit from treatment is an improved range condition and increased forage production. Improving range condition and forage production has a profound stabilizing effect on agricultural based communities. Ranchers are better equipped to plan long-term range management and ranch operations. A stable local economy stimulates businesses.

An increased forage supply on National Forest lands creates an atmosphere of security and encourages permittees and other landowners to develop and improve their lands. Also, livestock operations become more flexible, allowing the use of cattle as a tool to improve wildlife habitat through management. Wildlife habitat, especially for big game, is often improved by using cattle to apply grazing pressure, on a rotation basis, to grass early in the spring, thus reducing grass competition with desirable shrubs. Intensive livestock management using various forms of deferred- and rest-rotation grazing provides reserve forage and cover that wildlife may use. Herbicide can be used to improve wildlife habitat by removing brush that has invaded meadows and thinning dense stands of brush that are excess to wildlife needs.

The visual effects of herbicide application may cause alarm, depending on one's point of view. When properly handled and applied, 2,4-D is only moderately toxic. The hazard to humans, livestock, and wildlife is negligible, but may cause irritation to skin and eyes (14, 22).

G. ECONOMIC ANALYSIS

This is a benefit-cost analysis with dollar values reduced to present worth. The costs are computed from 1972 project costs. Forage increases are computed from Intermountain Region projects done five to seven years ago. Older projects are used for production values because they have stabilized and more nearly represent forage benefits on a long-term basis. The benefit is calculated using the 1973 fair market value of $3.98 for one animal unit month (AUM). This value results from the 1966 grazing fee study adopted in 1969. The $3.98 is derived from an index of private land grazing lease rates as determined by the Economic Research Service, USDA.

1. Project Costs	Costs per acre
a. Planning (includes cost of field examination by professional specialists)	$ .60
b. Project boundary marking	.30
c. Contract preparation and administration	.05
d. Spray contract (helicopter, herbicide, carrier equipment to transport material)	4.17
e. Supervision, flaggers, etc.	.30
f. COR salary, per diem, and travel	.40
Total per-acre cost	$ 5.82

a. Planning would include the preparation of the environmental analysis, the time spent by specialists, such as wildlife biologists in determining effect of the project on wildlife species, or landscape architects in suggesting patterns of treatment of an area to break up solid patches of continuous sagebrush, range scientists or plant ecologists to assess the vegetative aspects of treatment, and soil scientists to evaluate soil characteristics.

b. Actual marking project boundary with paper or flagging and removal of the same after project is completed.

c. Preparation of the contract, advertising, administration of contract after bid has been accepted. Designation of COR for contract administration and making payments.

d. Materials included in the contract are herbicide, carrier, inverting agent, and transportation of this material to actual project site. The contractor also furnishes helicopter, pilot, mechanic, gas for helicopter and other vehicles, pump for loading herbicide mixture from mixing tanks to helicopter, and manpower to do the same (this cost is based on the 1972 bid price).

e. The National Forest or Ranger District must have one person who is familiar with the area to be treated. This individual identifies boundary and areas of particular concern to COR and pilot. If flaggers are needed on the project they are also furnished by the Ranger District or National Forest.

f. The contracting officer's representative is an individual that has been specially trained in contract administration, in handling, and application of herbicides. He is the individual that determines with the pilot when and how the job is to be done. The pilot is responsible for the safety of the helicopter and himself.

There has been no cost included for loss of forage to livestock because nearly all treatment areas are in the rest or deferred unit of an allotment that is being managed intensively. An adjustment in usable forage is made to account for the rest period.

2. Project Economic Returns. Analysis of increased grass production on 17 five- to seven-year old projects in the Intermountain Region shows that annual production of grass increased an average of 845 pounds dry weight per acre. Research has shown similar results in other areas. Assuming 60 percent of this increase will be used for watershed protection, benefits to soil, plant vigor, and esthetics, then the remaining 40 percent of the increase is available for livestock and wildlife use. To arrive at dollar values, we have converted this available increased forage production to .37 AUM's per acre.* This increase in production will last an average of more than 20 years. There is a period toward the end of this cycle when production may taper off, as a balance between target species and other perennial vegetation is reached. We have used a 20-year expectancy for the purpose of analysis only. This is not intended to imply that forage production will drop to the level it was before treatment.

The annual economic return from usable forage is $1.47 per acre. This is arrived at by multiplying the 0.37 AUM's per acre increase by the $3.98 fair market value of one AUM.

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*845 lbs. x .40 = 338 lbs. 338 lbs. ÷ 900 lbs. (cow and calf need per month) = .37 AUM's per acre.

The present value of a $1.00 annual income extending over a period of 20 years at an interest rate of 10 percent, compound interest premise, where payments are received at the beginning of the year amounts to $9.914.

Multiplying the annual economic return of $1.47 times 9.914 (the present worth of expected future incomes) gives an expected economic benefit from forage of $14.57 per acre treated.

3. Benefit-Cost Ratio. The calculated benefit-cost ratio to the national economy over a 20-year period would be $\frac{\$14.57}{\$\ 5.82} = 2.50$. That is, for every $1.00 expended, the economy would benefit in the amount $2.50 from increased grass production available for use as forage.

4. Other Benefits Not Calculated. The predicted amount of usable forage has been evaluated on the basis of its worth as forage for cattle. In reality, a forage allowance is made for use by wildlife to the extent that they may be able to take advantage of additional forage production. Frequently, there are other factors limiting increased use by wildlife such as a shortage of winter range. In Nevada, Savage pointed out that increasing the amount of succulent vegetation for use by sage grouse during the summer would be of considerable benefit (53). Just what effect the total program actually has on a state-wide sage grouse population is uncertain. There is little question that there are a vast number of factors involved. Most states in the Intermountain Region have reported a general overall increase in sage grouse since 1965 (44).

When data is available, benefit values to game species are often calculated on the basis of increased hunter days created. A hunter day is calculated by the Forest Service as having a value of $6.00.

Values accredited to soil stabilization are based on the value of retaining soil on site and downstream values that may be damaged as a result of erosion. The value of retaining soil in place in the Sevier River Basin of Utah was set at $0.30 per cubic yard (62).

5. Alternative Cost Comparisons. Comparative project costs between chemical, prescribed burning, chaining, and plowing treatments are provided in the following tables: See Section V for discussion of alternatives.

a. Prescribed Burning	Cost per acre
(1) Planning (includes cost of field examination by professional specialists)	$ .75
(2) Project boundary marking and mapping	.30
(3) Fireline preparation control costs (highly variable)	2.00
(4) Seeding costs when applicable (aerial application)	(5.00)

a. Prescribed Burning (cont.)

		Cost per acre
(5)	Supervision and labor	$ .85
(6)	Equipment costs (trucks, torches and fuel)	.10
	Subtotal	$ 4.00
(7)	Burning requires nonuse of the entire pasture or unit prior to burning in order to furnish dry grass to help spread fire. This value is highly variable and may average $2 per acre actually burned.	2.00
	Total project cost an acre without seeding	$ 6.00

Forage gained is approximately the same as for chemical treatment - .37 AUM's per acre.

b. Chaining or Railing

(1)	Planning (includes cost of field examination by professional specialists)	$ .45
(2)	Project boundary marking and mapping (includes marking and protecting land survey markers)	.45
(3)	Seeding costs when applicable (aerial application)	(5.00)
(4)	Contracting and tractor rental (twice-over chaining)	6.00
(5)	Equipment costs (trucks, chain repair, etc.)	.60
(6)	Supervision and labor	1.00
	Subtotal	$ 8.50
(7)	No grazing loss during treatment if seeding is not employed (planned rest grazing system employed). When seeding is employed benefits are delayed two years and nonuse of the unit is necessary.	
	Total project cost per acre without seeding	$ 8.50

Forage increase resulting from a chaining project is usually less than for chemical control because sagebrush control is less, thus more competition to forage species. Annual net usable forage gained from chaining sagebrush averages .3 AUM's per acre.

c. Plowing and Seeding (one recent project)

	Cost per acre
(1) Planning (includes cost of field examination by professional specialists)	$ .55
(2) Project boundary marking and mapping (includes marking and protecting land survey markers)	.45
(3) Seeding costs (seed drilled in)	7.00
(4) Contracting and equipment rental	10.00
(5) Equipment costs (trucks, plows, and drills)	1.00
(6) Supervision and labor	2.00
Subtotal	$ 21.00
(7) Grazing lost during treatment period due to additional rest (highly variable)	1.42
Total project cost per acre includes seeding	$22.42

Net benefits are delayed at least two years after treatment. Expected annual increase in net usable forage is .3 to .4 AUM's per acre.

H. SIZE OF ANNUAL HERBICIDE PROGRAM

In the past five years an annual average of slightly less than 15,000 acres have been treated by the Forest Service in Idaho. This average is not expected to increase.

The planning and environmental analysis made on each project area materially reduces the acreage that can be sprayed. Consequently, spray areas are in small blocks; they are irregular in shape and intermingled with numerous strips and patches not receiving treatment. See Figure 2 for example of typical project area and general spray area. It should be noted that additional control is placed on the ground at the time of actual spray application to avoid spraying water areas and nontarget vegetation.

I. LANDOWNERSHIP AND STATUS

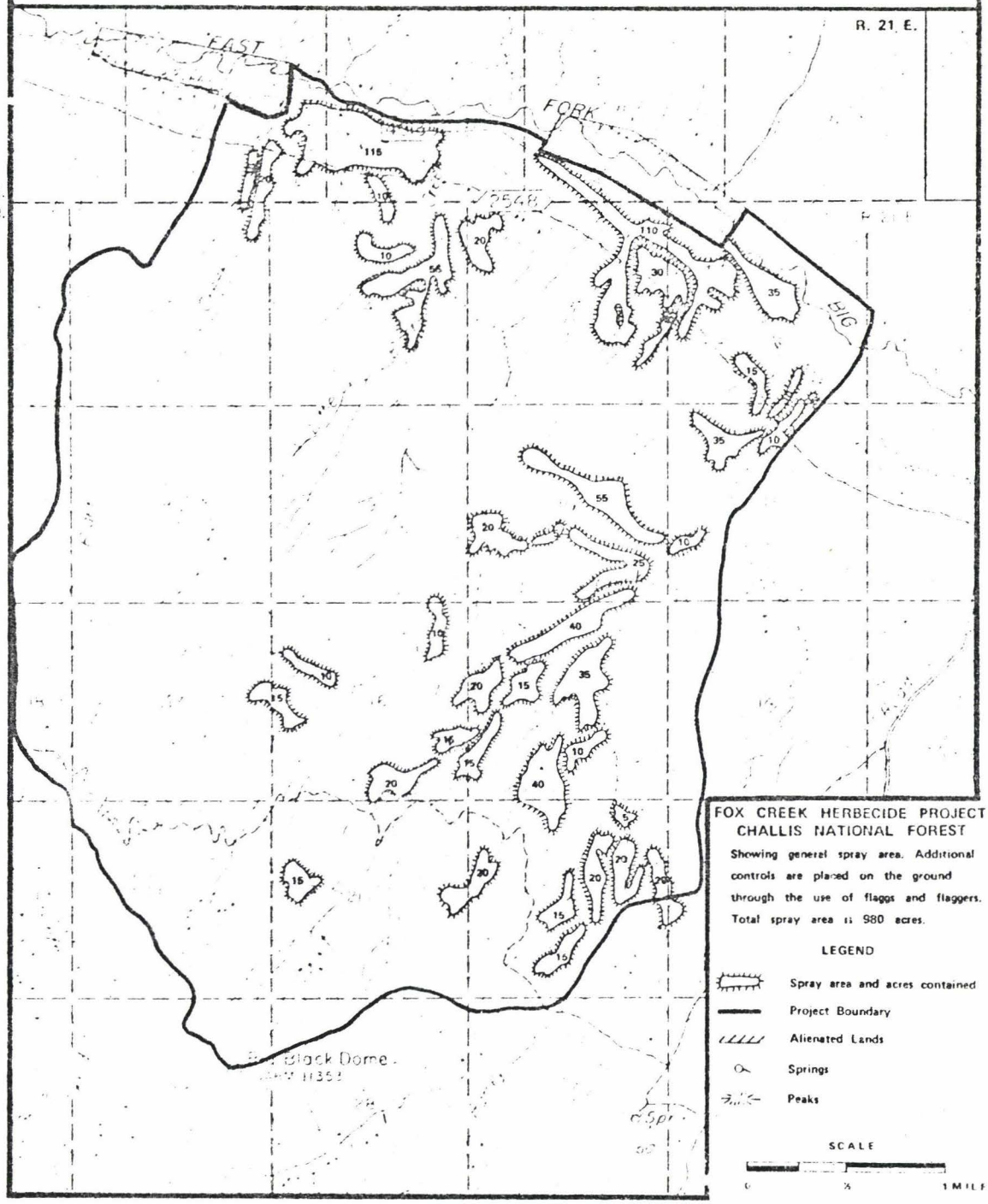
All lands involved are Federally owned and are administered by the Intermountain Region, Forest Service, U.S. Department of Agriculture.

J. PHYSIOGRAPHY AND CLIMATE

The National Forest lands of southern Idaho are drained by the Snake and Bear Rivers.

FIGURE NO. 2

Typical project area showing design and size of spray areas. Due to map scale it is not always possible to show leave strips along streams and other sensitive areas. Additional control using flags or men holding flags are placed on the ground.



The project areas are in mountainous terrain except for some minor foothill areas. Elevations vary from 4,500 to 10,000 feet. Annual precipitation varies from 10 to approximately 25 inches. Most precipitation comes during the winter in the form of snow. Summer precipitation is frequently in the form of thundershowers. Mean annual temperatures vary between 37° and 52° Fahrenheit.

K. SUBSEQUENT MANAGEMENT

Treated areas are generally part of the grazing allotment. On such allotments a spray project cannot be approved unless the grazing allotment management plan provides for intensive management after treatment. The number of growing seasons that a spray area is rested from livestock grazing depends on its condition classification. In all cases it is rested the year the project is done. Some form of planned-rest management is practiced on the grazing allotment. The spray project is planned to be done the same year this portion of the allotment is scheduled for rest. If more rest is needed, the grazing sequence is repeated the following year. This management system does not require permittees to reduce permitted livestock use as a result of the spray project. Regardless of whether an area receives chemical or mechanical treatment or not, grazing must be kept in balance with forage supply and be compatible with other values as directed by the Multiple Use and Sustained Yield Act.

L. HISTORY OF PROGRAM

Herbicide use on National Forest rangeland started in about 1946 with test areas and trials on small acreages. First tests were done with backpack sprayers and farm sprayers. Considerable interest among land administering agencies and universities developed in the late 1940's and early 1950's. Tests were made to determine kinds and amount of herbicides to use, timing of application, and evaluation of results. It was generally concluded that two pounds active ingredient of 2,4-D per acre gave best results per dollar cost, even though lighter rates gave some control (8, 16, 25, 42).

When range scientists were convinced that herbicides were useful tools, larger acreages were sprayed using fixed-wing aircraft. By about 1960, it was recognized that applications by fixed wing aircraft gave some undesirable results that needed correcting. This method lacked needed control of application, resulting in nontarget vegetation types being affected. The large block type treatment was found to have some undesirable impacts on wildlife habitat, especially sage grouse.

In the early 1960's helicopters were employed for herbicide application. These machines provided excellent control. They made it possible to develop meandering irregular patterns and to avoid spraying nontarget areas.

Spray drift and volatilization have often been a problem when spray areas were closely associated with critical areas such as water and nontarget vegetation. Emulsifying and inverting additives have largely eliminated this problem. Considerable difficulty in using these additives was encountered at first. Inverting agents have since been developed that do an excellent job of control but still cause some handling problems. Most problems encountered are mechanical. Even though application techniques have developed to a fine art and undesirable effects of herbicide use can largely be eliminated, success of the program is still dependent on the personnel who plan and carry out the program.

Today, efforts are being directed away from obtaining maximum kill of target species and toward applying only the control necessary to upgrade the usefulness of the sagebrush ecosystem.

II. ENVIRONMENTAL IMPACTS

A. AIR

There will be a minor introduction of 2,4-D into the air during and immediately after application. This cannot be seen but the smell of 2,4-D is noticeable for a few days. The use of an invert emulsion reduces the possibility of the carrier evaporating away from the herbicide leaving minute particles floating in the air.

B. SOIL

Studies have shown that 2,4-D degradation in forest litter is about 85 to 90 percent after 13 days when applied at two pounds acid equivalent per acre (45, 46). Esters of 2,4-D are not considered to be persistent in the soil. Soil micro-organisms readily break the chemical down. The residence time for 2,4-D used for sagebrush control is, at most, about four weeks (22). Test applications during the growing season of 20 pounds per acre usually disappear in two months (22).

Soil moisture conditions and temperature in the sagebrush areas are somewhat dryer and perhaps a little cooler than where the Oregon studies were conducted. However, 2,4-D is applied in the spring (May 15 to July 5) when soil moisture and temperature are high enough to provide for active growth of the target species, so degradation of 2,4-D should approximate the Oregon studies.

Soil compaction resulting from equipment during application is minimal. Post project evaluations have not shown damage to the soil.

C. VEGETATION

Degradation of 2,4-D in plants has been found to reach 85 percent in 13 days following application (45). The greatest impact results from injuring or killing some plants susceptible to 2,4-D.

1. Sagebrush. Percent mortality of sagebrush depends on the species, subspecies, soil moisture, and stage of growth of the plant (16, 42). Projects normally range from 60 to 95 percent mortality. Frequently seedlings escape injury because of protection from overstory plants. Conventional methods of application using three gallons diesel and two pounds of 2,4-D (acid equivalent) per acre generally give mortality near 90 percent (8). Newer methods and lighter concentrations of 2,4-D being used indicate that mortality can be reduced to a more optimum level of 70 percent.

2. Grass. Grass is not affected by 2,4-D in the concentration used. Consequently, grass may increase rapidly and compete with other desirable vegetation. Under some circumstances, special management of cattle is necessary to apply grazing pressure to grass, thus releasing space and soil moisture to forbs, bitterbrush, and similar shrubs.

3. Forbs. Many forb species will be affected by 2,4-D while others will not. Frequently the number of individual plants are reduced, especially annuals. Some forbs have the aerial portion damaged but root sprout the following year. Many forbs are early spring or summer growers and are not significantly affected by 2,4-D because of their season of growth. Table 1 shows the relative susceptibility of various forb species one to three years after treatment with 2,4-D as evaluated by Blaisdell and Mueggler (8). Table 2 shows production of species before treatment and three years after treatment as reported by Mueggler and Blaisdell (41). These data show a 29 percent increase of forbs on the sprayed area. This increase is probably a result of weather and measurement factors and not an actual increase resulting from the spray treatment. Forb increase on the burned and railed areas was much higher than on the sprayed area. These data also show that species of the genus Lupinus are greatly reduced the first few years after treatment with 2,4-D.

"In extensive spraying in Wyoming, Hull and Vaughn found mainly top kill of species associated with sagebrush. The only permanent effect was a heavy kill on phlox and a 20% kill on rabbitbrush" (24). Also see Hull, A. C. Jr. et al (25). In Wyoming on two study sites on the Gros Ventre River drainage where 2,4-D was used, it was found that forb production remained fairly stable on one site on treated and untreated plots, and the other site produced 584 pounds of forbs (air dry) on the treated plot compared to 562 pounds on the untreated plot (65).

Analysis of data on 17 five- to seven-year old Intermountain Region projects shows forbs decreased an average of 17 pounds per acre after treatment. Forbs increased on four projects and showed a significant decrease on two projects. Wyethia and Lupinus species accounted for most of the decrease. On poor condition ranges many least desirable forbs have increased beyond their natural abundance. These plants decrease in number as ranges improve regardless of whether herbicide is applied or not.

4. Shrubs. Table 1 shows the relative susceptibility of most shrubs found associated with spray areas (8). One common species not mentioned is Cercocarpus montanus. This species is defoliated by 2,4-D but the roots sprout. Any time either Cercocarpus or Amelanchier species occur with significant density, the area is not sprayed. Occasionally Amelanchier occurs as old decadent plants, and 2,4-D defoliates the aerial portion and usually induces root sprouting. However, recovery following treatment is slow. Other susceptible shrubs in Table 1 are nontarget species and are not commonly found within spray areas. Bitterbursh, Purshia tridentata, a very desirable shrub, will increase after reduction of sagebrush competition if the site is favorable and big game grazing is not excessive. One study in Idaho showed 60 percent more Purshia on treated areas as opposed to untreated after three years (41). Results similar to this have been obtained on several National Forests.

TABLE 1. MORTALITY OF PLANTS ON AREAS SPRAYED WITH 2,4-D TO CONTROL BIG SAGEBRUSH[1/]

Species	Mortality[2/]
Shrubs and Trees	
Amelanchier alnifolia	Heavy
Artemisia cana	Moderate
Artemisia tripartita	Heavy
Ceanothus velutinus	Unharmed[3/]
Pinus contorta	Light[3/]
Populus tremuloides	Light[3/]
Potentilla fruticosa	Unharmed
Prunus virginiana	Light[3/]
Pseudotsuga menziesii	Unharmed
Purshia tridentata	Light[3/]
Salix spp.	Light[3/]
Symphoricarpos oreophilus	Light[3/]
Tetradymia canescens inermis	Unharmed
Forbs	
Achillea millefolium	Unharmed
Agastache urticifolia	Light
Agoseris spp.	Moderate
Antennaria microphylla	Light
Aplopappus sp.	Unharmed
Arnica fulgens	Light
Astragalus convallarius	Unharmed
Astragalus miser praeteritus	Unharmed
Astragalus salinus	Unharmed
Astragalus stenophyllus	Heavy
Balsamorhiza sagittata	Heavy
Forbs (Cont.)	
Calochortus macrocarpus	Unharmed
Castilleja spp.	Heavy
Comandra umbellata	Light
Crepis acuminata	Unharmed
Delphinium depauperatum	Unharmed
Delphinium glaucescens	Unharmed
Erigeron corymbosus	Light
Eriogonum heracleoides	Light
Eriogonum ovalifolium	Unharmed
Geranium viscosissimum	Unharmed
Helianthella uniflora	Heavy
Linum lewisii	Unharmed
Lithospermum ruderale	Moderate
Lupinus caudatus	Heavy
Lupinus leucophyllus	Moderate
Mertensia oblongifolia	Heavy
Opuntia polyacantha	Unharmed
Penstemon radicosus	Light
Penstemon spp.	Heavy
Perideridia gairdneri	Unharmed
Phlox canescens	Light
Potentilla spp.	Heavy
Rumex sp.	Unharmed
Senecio integerrimus	Light
Geun triflorum	Heavy
Solidago sp.	Unharmed
Viola spp.	Unharmed
Zigadenus paniculatus	Heavy

1/Blaisdell, J. P. and Mueggler, W. F., 1956. Effects of 2,4-D on Forbs and Shrubs Associated with Big Sagebrush. Journal of Range Management, 9:38-40.

2/Ratings: Unharmed, light, 1 to 33 percent kill; moderate, 34 to 66 percent kill; heavy, 67 to 100 percent kill.

3/Severe damage to aerial portions, but few plants completely killed--almost all sprouted profusely.

Table 2 - Herbage Production Before Treatment (1952) and After Treatment (1955) On Comparable Areas Subjected to Different Methods of Treatment.

Species	Burned		Sprayed		Railed	
	1952	1955	1952	1955	1952	1955
	(Airdry pounds per acre)					
Total Grass*	229	295	245	430	200	310
Total Forbs	82	307	65	92	80	223
Total Shrubs	361	137	281	219	267	184
TOTAL PRODUCTION	672	739	591	741	547	717
(Forbs)						
Achillea lanulosa	3	9	-	Trace	-	1
Antennaria microphylla	4	4	5	18	7	39
Arnica fulgens	1	2	5	6	23	20
Astragalus miser	-	3	Trace	4	1	6
Astragalus convallarius	-	10	-	2	-	4
Comandra umbellata	3	2	5	3	1	1
Erigeron corymbosus	9	38	14	13	21	44
Eriogonum heracleoides	8	13	8	17	2	10
Lupinus spp.	41	148	15	4	6	51
Penstemon radicosus	5	3	5	7	5	9
(Shrubs)						
Artemisia tridentata	337	47	269	178	257	144
Chrysothamnus puberulus	5	68	3	12	3	20
Purshia tridentata	14	Trace	5	13	-	-
Tetradymia canescens	5	21	4	17	6	20
Others	8	79	8	18	15	38

*Grass species were not separated in the 1952 survey.

Taken from Mueggler and Blaisdell (41).

5. Trees. Pine species are susceptible to 2,4-D and diesel oil and are often injured if sprayed. Aspen trees generally lose their canopy but roots sprout profusely. Spruce and fir trees are generally resistant to 2,4-D. Trees are not included within spray areas unless they occur as scattered individuals.

6. Aquatic Vegetation. There will be no impact on aquatic vegetation unless some accident should happen, such as a helicopter loaded with 2,4-D crashing into the water. In this case damage to aquatic life would occur. Water areas are not sprayed and a minimum 100-foot or larger buffer strip is left untreated next to streams, ponds, and lakes.

D. WATER

Even though water is not sprayed and buffer strips are provided, it is possible for minute amounts of chemical to enter live streams. When herbicide is applied at a rate of two pounds, a.i., per acre directly to water, concentrations of .7 ppm (parts per million) can be expected in 12 inches of still water (22). In seven years of monitoring spray operations in Oregon, scientists have never found residues exceeding 1.0 ppm, and residues seldom exceeded .1 ppm when streams flowed through spray areas. Concentrations seldom exceeded .01 ppm when streams flowed adjacent to treated areas (46). Projects being proposed here will use herbicide concentrations lower than those used in collecting the above data and streams will not be included in the spray areas. Buffer strips of more than 100 feet are always required and application when wind is away from streams is the general practice.

Phenoxy chemicals entering water may be lost by volatilization, absorption on sediments, absorption by aquatic biota, by chemical degradation, and most importantly, by dilution as additional stream water passes down the channel. Almost all authorities agree that there is considerable absorption of herbicides on sediments (2, 7).

The hazard of herbicides in water depends on the toxicity and concentration of the herbicide. There are two kinds of toxicity - acute and chronic (see Tables 3 and 4). Acute toxicity is exposure to relatively large doses for a few hours to a few days, and chronic toxicity is exposure to relatively low levels for longer periods of time. Normally, acute toxicity is of most concern. The toxicity, as determined in the laboratory using pure water, may be more toxic to aquatic biota than under field conditions because of losses previously outlined. The State of California, citing results obtained from many studies, stated that tomatoes were irrigated with tap water containing 20 mg/l (approximately 20 ppm) of 2,4-D. In most instances the tomatoes were more vigorous than when treated with straight tap water. Cotton was treated in a similar manner with 11 mg/l (11 ppm) with similar results (38).

Studies at the San Dimas Experimental Forest in California showed that 2,4-D and 2,4,5-T used for vegetation type conversion did not impair streamflow quality (36). Researchers found herbicide content of water samples was well below what they considered the safe limit of 1 ppm. Stream samples contained a maximum of .05 ppm and shallow well samples contained a maximum of .04 ppm.

There are conflicting opinions as to the amount of increased infiltration resulting from spray projects. Soil types, topography, and land management after application have significant influence on infiltration. On many project areas overland flow has become insufficient to provide enough water for storage in ponds previously used to collect overland flow for livestock use. This indicates that infiltration has increased. Studies in Wyoming show that sprayed sagebrush areas retain more snow and have a higher soil moisture level than untreated areas (1).

In a six-year study on the Curlew National Grassland, Hull and Klomp found that big sagebrush intercepted 30 percent of the rain and 37 percent of the snow. This intercepted moisture evaporated into the air and did not recharge the soil moisture supply; hence, there was less soil moisture available for vegetation production than where sagebrush was controlled (24).

In a one-year study at 9,500 feet elevation near Dubois, Wyoming, Hutchison found that some snow persisted on a sagebrush site between sagebrush plants for a short while after it had disappeared from a natural grass type (27).

E. ESTHETICS

There is considerable change in appearance of treated areas in contrast to nontreated areas. Untreated areas have a visual dominance of sagebrush while treated areas usually have a visual dominance of grass and dead brush. After a number of years (5 to 10) the dead brush is usually broken down and the remaining live sagebrush and new sagebrush tends to neutralize the contrast with untreated areas. If the dead sagebrush stalks are objectionable, they can be eliminated by dragging a roller or an anchor chain over the area.

F. SOUNDS AND SMELL

A person familiar with the smell of 2,4-D will notice its presence for a few days after application. Depending on one's point of view, this smell may or may not be objectionable. In either case the smell is not strong.

About the only unusual sound involved is the noise caused by the helicopter. Because of wind and temperature restrictions, most flying is done from daylight until about 10:00 a.m. On occasions some flying is done at dusk.

G. HUMAN HEALTH

Spectators are not allowed on the project area during application. The only known hazard is to workers handling the chemical. Precautions are taken to minimize this hazard by regular change of clothing and frequent washing with soap and water.

H. ANIMALS, BIRDS, AND INSECTS

Numerous studies have been reported in relation to toxicity of 2,4-D and other herbicides. In general, all report essentially the same results noted by House et al (22). "We conclude that the risk of human and animal toxicity from the use of 2,4-D and its various esters and salts is very very low." This same paper cites studies where 2,4-D dust applied directly to honey bees and also placed in the hive entrance did not adversely affect adult bees nor the brood. There have been cases where cattle were poisoned from eating plants high in nitrate. It has been suggested that 2,4-D may make the plants more palatable. This is not considered a problem on National Forest lands. Furthermore, treated areas are not grazed by livestock the season of treatment.

Studies have been conducted where 2,4-D was fed to dairy cows and steers. The 2,4-D was found unchanged in the urine only. No evidence of metaoxidation was found (3, 4, 20, 21, 37). Similar findings were obtained with sheep. Ninety-six percent of an orally administered dose of 2,4-D-C-^{14} to a sheep was excreted unchanged in the urine in seventy-two hours and slightly less than 1.4% in the feces (68).

In rats receiving 1 to 10 mg. of 2,4-D, there was almost complete excretion of the chemical in the urine and feces in 48 hours. At higher dosage levels, some accumulation in tissues occurred. Analysis also indicated that traces of an unidentified metabolite appeared in the urine (32). The studies with presently available commercial formulations of 2,4,5-T and 2,4-D show no teratogenic effects in rats at rates up to 50 mg/kg/day and 87.5 mg/kg/day respectively. Some fetal resorptions appear at higher levels according to Johnson's summary of a variety of tests for teratogenicity (29). See Tables 3 and 4.

Kopischke described an experiment where fertile pheasant and bantam chicken eggs were sprayed to the point that solutions dripped off on the 13th day of incubation (35). The three solutions used were water, isooctyl ester of 2,4-D and water, and straight diesel fuel (the chicken eggs did not receive the diesel treatment). Eggs were then placed back in an incubator for completion of the incubation period. Table 5 summarizes hatch results of this experiment. Three hatched pheasants were deformed - one in the 2,4-D group and two in the water only group. No hatched chickens were deformed. It should be pointed out that spraying eggs to the point that the solutions dripped from them would be many times the amount used on Forest Service projects.

Table 3 - CHRONIC TOXICITY OF 2,4-D

Formulation	Organism	Dose	Duration	Effect	Reference
Triethanolamine	Swine	50/mg/kg/day	8-10 doses	Minor transient effects.	(a)
Butyl ester	Swine	50/mg/kg/day	5 doses	None	(a)
Triethanolamine	Swine	500 ppm in feed	1 month	Some locomotory disturbance, depressed growth rate, no gross pathology	(a)
Triethanolamine	Rats	1000 ppm in water	10 mos.	Depressed growth rate, no gross pathology	(a)
Triethanolamine	Chicken	1000 ppm in water	Daily from hatching through first 2 mos. of egg production.	Egg size normal, production reduced 30%.	(a)
Not specified	Dog	500 ppm in feed	2 years	None	(b)
Not specified	Rat	1250 ppm in feed	2 years	No effects on growth, survival hermatology or tumor incidence.	(b)
Not specified	Rat	500 ppm in feed	2 years	No effects in reproduction studies.	(b)

Table 3 - CHRONIC TOXICITY OF 2,4-D (Cont.)

Formulation	Organism	Dose	Duration	Effect	Reference
Ethylhexyl ester	Cattle	250/mg/kg/day	14 days	Sick in 3 days, survive & recover from 9 doses. 14 doses lethal.	(c)
Ethylhexyl ester	Sheep	250/mg/kg/day	17 days	Sick in 3 days - 17 doses lethal.	(c)
Ethylhexyl ester	Sheep & Cattle	100/mg/kg/day	10 days	None to minor effects	(c)
2,4-D in water	Human taste threshold	.01mg/l*		Bad taste	(d)
Alkanolamine	Sheep	100/mg/kg/day	481 days	No effect	(e)
Alkanolamine	Cattle	50/mg/kg/day	112 days	No effect	(e)
Propylene glycol butal ether ester	Sheep	100/mg/kg/day	481 days	No effect	(e)
Alkanolamine	Chicken	100/mg/kg/day	10 days	No effect on weight gain	(f)
Propylene glycol butal ether ester	Chicken	50 mg/kg/day	10 days	No effect on weight gain	(f)
Propylene glycol butal ether ester	Cattle	100mg/kg/day	10 days	No effect	(f)
Acid	Mule deer	80 & 240mg/kg/day	30 days	Minor symptoms - no weight loss	(g)

*mg/l is approximately the same as ppm.

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U.S. Dept. of Interior.

Table 4 - ACUTE TOXICITY OF 2,4-D

Formulation	Organism	Dose	Effect	Reference
Triethanolamine	Swine	50 mg/kg	No effect	(a)
Triethanolamine	Swine	500 mg/kg	Lethal	(a)
Butyl ester	Swine	100 mg/kg	No effect	(a)
Triethanolamine	Chicken	300 mg/kg	No effect	(a)
Butoxyethanol ester	Phytoplankton	1 ppm	16% decrease in CO_2 fixation	(b)
Dimethylamine	Phytoplankton	1 ppm (4 hrs)	No effect on CO_2 fixation	(b)
Ethylhexyl ester	Phytoplankton	1 ppm (4 hrs)	49% decrease in CO_2 fixation	(b)
Propylene glycol butyl ether ester	Phytoplankton	1 ppm (4 hrs)	44% decrease in CO_2 fixation	(b)
Butyl ester	Rats	620 mg/kg	LD_{50}	(c)
Unspecified	Trout	3 mg/l*	Lethal 24 hrs	(d)
Unspecified	Trout	2.2 mg/l*	Lethal 48 hrs	(d)
Unspecified	Man	689 mg/kg	Lethal	(d)

* mg/l is approximately the same as ppm.

Table 4 - ACUTE TOXICITY OF 2,4-D (Cont.)

Formulation	Organism	Dose	Effect	Reference
Isopropyl ester	Rats	700 mg/kg	LD_{50}	(e)
Propylene glycol butyl ether ester	Bluegill	3 ppm	48 hr TLm	(f)
Alkanolamine	Bluegill	435 ppm	48 hr TLm	(g)
Isooctyl ester	Bluegill	9 ppm	48 hr TLm	(g)
Butyl ester	Bluegill	1 ppm	48 hr TLm	(g)
Isopropyl ester	Bluegill	1 ppm	48 hr TLm	(g)
Dimethylamine	Bluegill	166 ppm	48 hr TLm	(g)
Alkanolamine	Chicks	380-765 mg/kg	LD_{50}	(h)
Isopropyl ester	Rats	700 mg/kg	LD_{50}	(h)
Isopropyl ester	Chicks	1420 mg/kg	LD_{50}	(h)
Isopropyl ester	Guinea pigs	550 mg/kg	LD_{50}	(h)
Butyl ester	Rats	620 mg/kg	LD_{50}	(h)
Butyl ester	Guinea pigs	848 mg/kg	LD_{50}	(h)
Butyl ester	Chicks	2000 mg/kg	LD_{50}	(h)
Propylene glycol butyl ether ester	Rats	570 mg/kg	LD_{50}	(h)

Table 4 - ACUTE TOXICITY OF 2,4-D (Cont.)

Formulation	Organism	Dose	Effect	Reference
Acid	Dogs	100 mg/kg	LD_{50}	(h)
Acid	Chicks	541 mg/kg	LD_{50}	(h)
Unspecified amine	Mallard ducks	2000 mg/kg	LD_{50}	(i)
Acid	Pheasants	472 mg/kg	LD_{50}	(i)
Acid	Mule deer	400-800 mg/kg	LD_{50}	(i)

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(a) Bjorkland, Nels., and Erne, K. - 1966
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Table 5 - Hatching results of pheasant and chicken eggs treated with water (control), 2,4-D solution, and diesel fuel.

From Kopischke 1972 (35).

	Treatment					
	Water		2,4-D		Diesel Fuel	
	Number	Percent	Number	Percent	Number	Percent
PHEASANT EGGS						
Hatched	25	44	29	51	0	0
Not Hatched	32	56	28	49	57	100
Total	57	100	57	100	57	100
CHICKEN EGGS						
Hatched	18	29	21	34	-	-
Not Hatched	44	71	41	66	-	-
Total	62	100	62	100	-	-

The area of greatest concern is with wildlife habitat and the effect 2,4-D has on it. From review of the research literature pertaining to wildlife, the greatest impact appears to be on sage grouse habitat, deer winter range, and antelope winter range. There are cases both on public and private land where use of herbicides has had detrimental effects on wildlife habitat. This has been true where large blocks - several hundred acres - of sagebrush have been sprayed and a high percentage of the sagebrush has been killed. On all spray projects, knowledge gained from research and experience is utilized in developing plans that will ensure the least possible adverse effect on the environment.

I. CLIMATE

This program will have no effect on the overall climate. The microclimate will be altered to some extent, but the net result is not considered to be detrimental.

J. PLANNED MEASURES TO MINIMIZE ENVIRONMENTAL IMPACTS

1. Research and experience have shown that two pounds of 2,4-D (acid equivalent) per acre are necessary to consistently obtain a high percentage (90 percent) control of the target species (1, 14, 49, 61, 63). One and one-half pounds 2,4-D (acid equivalent) is being used for aerial application in an effort to control approximately 70 percent of the sagebrush. This has been determined to be a more optimum target level of control on the spray area.

2. The conventional method is to apply three gallons per acre of diesel oil as a carrier for 2,4-D. The combination of oil and herbicide tends to have a higher mortality effect than either one alone. Where this effect is termed to be undesirable, a water carrier can be substituted in some cases. Water as a carrier also has some undesirable characteristics. Water tends to evaporate, thus releasing some herbicide particles in the air allowing drift of herbicide to nearby areas. When evaporation, volatilization, and drift are deemed to be of an adverse nature, an inverting agent is used.

When the inverting agent "Bivert" is used, water is the major carrier component and diesel is reduced from three gallons per acre to less than one-half gallon per acre. The inert, inverting agent mixed with diesel oil (oil phase) forms a thick mayonnaise-like consistency which

encapsules the droplets of water and herbicide mixture (water phase) forming a droplet highly risistant to drift, evaporation, and volatilization. Droplet size of 400 to 800 microns is desirable.

3. The volatility of 2,4-D is largely dependent on the alcohol used to develop the esters of 2,4-D. Short carbon-chained alcohols develop high volatile esters, while long carbon-chained alcohols develop low volatile esters. Only esters of the low volatile nature are used.

4. Spraying is done by helicopter rather than by fixed-wing aircraft, since safe low-level flying at much reduced air speed can be accomplished with the helicopter. Also, the helicopter is maneuverable and allows precise herbicide application to the designated spray area. This reduces the chances of accidentally spraying nontarget areas.

5. Spraying is done when winds are less than six miles per hour, thus reducing drift to a minimum. Winds are monitored at all times on the project area during herbicide application.

6. Spraying is done when the temperature is below 70° Fahrenheit. This reduces problems encountered from evaporation, volatilization, and air turbulence. Temperature is monitored at all times on the project area during application.

7. All spray areas are carefully mapped using criteria developed in the planning process. The design of patches and strips is an important phase of the mapping. Spraying large blocks is avoided, since a "patchy" design is more compatible for use by wildlife - Figure 2.

8. Flags on tall poles or "flaggers" are used to further define "treat" and "no-treat" areas. Due to the scale of maps, all special areas cannot be shown on maps - Figure 2.

9. The size of spray areas is reduced by having untreated strips greater than 100 feet adjacent to streams, lakes, ponds, and sensitive nontarget vegetation types. On small acreages and confined areas application of herbicide is by a ground-based machine, where possible, rather than by helicopter.

10. All projects are supervised by personnel trained in application and handling of herbicides. Helicopter application is done by licensed applicators. Each helicopter is accompanied by a Forest Service employee COR (contracting officer's representative) who has had special safety training and has full authority to suspend operations if any hazard develops.

11. When possible, timing of application is done when target species are still susceptible and nontarget species are least susceptible to 2,4-D. This timing reduces the adverse effect on nontarget species, occurring on the spray area, which often have a different critical application time period.

Forbs are of most concern in planning an application timetable. This consideration is dependent on the species of forbs present. Generally speaking, spraying as early as snow and soil moisture conditions will allow access to the site, but after sagebrush starts to grow, is preferred. Most forbs are just starting to develop and are less susceptible to 2,4-D before flowering than during flowering time. This susceptibility appears to be related to photosynthesis and the translocation away from the roots to growing aerial portions of the plants. Thus, the tops are damaged but damage to the roots is reduced. Defoliation and injury to the cambium tissue of sagebrush species, other than A. cana and A. tripartita, is largely fatal to the plant and translocation to the roots is not so important.

III. FAVORABLE ENVIRONMENTAL EFFECTS

A. AIR

Herbicide itself is not known to have any favorable effects on air quality. When considering the use of herbicide as opposed to the alternatives of fire and mechanical methods, the air is kept free of smoke and dust.

B. SOIL

The long-term favorable effects to the soil vary widely depending on the conditions that exist on each spray area. Benefits are most pronounced on areas where ground cover is sparse and where sagebrush makes up the major part of the vegetative composition. Benefit potentials are:

1. Increased ground cover to protect soil from high intensity rain, thus preventing movement of soil.

2. Increase in vegetation and litter cover on soil surface, thus aiding in absorption of precipitation.

3. Decrease in high fluctuation of soil surface temperature, thus providing better opportunity for seedlings to establish.

4. Improved soil structure due to increased amount and variety of roots, increased organic matter content, and increased activity of soil organisms.

5. Long-term improvement in fertility levels through better nutrient cycling provided by a stand of mixed vegetation rather than a few species.

6. Increased soil moisture level available to other plants (24).

7. Less interception of precipitation resulting in more precipitation finding its way to the soil to recharge the soil moisture supply (24).

C. VEGETATION

The amount and type of favorable effects vary widely depending on conditions prior to treatment and capability of the site. Benefit potentials are:

1. Increased forage production.

2. Improvement in composition of desirable forage species, thus higher quality forage.

3. A composition diversity of plant species which provides:

a. Better buffer potential against insect and disease attack.

b. More diversified habitat for a greater number of animal and bird species.

D. WATER

Because most sagebrush areas fall in a low precipitation belt, these lands produce but little water for streamflow. However, if in poor condition, they lose considerable water from overland flow during high intensity storms. Such water lost is of poor quality when it reaches streams due to a high sediment load. Spraying sagebrush increases herbage production, which in turn improves ground cover, and root penetration and distribution. The overall effect is to reduce overland flow, but the water quality of any overland flow that does occur will be of higher quality due to a greatly reduced sediment load.

E. VISUAL APPEARANCES

The long-term effect of changing a given site from one dominated by dense sagebrush to a site expressing a variety of species is generally considered favorable. Initially, some of the desirable appearances are neutralized by the dead sagebrush stems.

F. SOUNDS, SMELL, AND HUMAN HEALTH

There are no known effects either favorable or unfavorable resulting from the program.

G. ANIMALS

The reduction of excessively dense sagebrush and the restoration to a more balanced vegetative cover induced by the treatment, results in increased carrying capacity of the land for livestock and often enhances the overall wildlife habitat. Increases in capacity must be measured by weighing the losses against the gains. Excessive reduction of sagebrush may be detrimental to some animals and favorable to others. Each project must be designed so that the amount of area treated and degree of sagebrush controlled brings about an optimum balance. One must be able to separate actual gains and losses from the theoretical gains and losses. Following are known favorable effects that occur:

1. Livestock. Increased forage production can be expected. Sustained increases of 800 pounds to 1,500 pounds of airdry forage per acre are common (1, 16, 31, 49, 61). Without reduction of dense sagebrush, only slight improvement in forage yield can be expected on many ranges even after good grazing practices have been used for 15 to 30 years (49, 58). Improved livestock management is much more practical when higher yields are obtained. Frequently livestock losses from poisonous plants are reduced.

2. Elk. Elk can benefit along similar lines as livestock. Response may not be as great because of the difficulty in management of the animal itself.

On two study sites on the Gros Ventre River drainage in Wyoming it was found that elk showed a 55 percent increase in use on one treated site and 69 percent increase in use on the other site one year, and a 40 percent increase in use on both sites the previous year as compared to adjoining untreated big sagebrush sites (65).

3. Antelope. Benefits to antelope are dependent on removing only the sagebrush that is excess to their needs. With this criteria in mind they will benefit by increased forage supply and variety (6). Tall dense sagebrush is avoided by antelope if they have a choice. It has been suggested that antelope prefer range where they have freedom to run and are able to observe predators. There are several instances where antelope have extended their range to areas where density of sagebrush has been reduced by 2,4-D. When large acreages of sagebrush are available to provide a choice, antelope favor sagebrush with a canopy density of about 10 to 30 percent (6, 18).

4. Mule Deer. Deer are similar to antelope except they will utilize tall brush more readily. The value of sagebrush, particularly those species or subspecies high in volatile oils, can be overrated for big game. Analysis of reports on feeding trials, laboratory tests, and rumen sample examinations indicates that an optimum level of sagebrush in a deer's diet would fall somewhere around 45 percent, providing a mixture of other nutritious forage is available (13, 18, 26, 43, 55). Where bitterbrush and other root sprouting shrubs occur, reduction of sagebrush greatly increases the potential for increased production of other shrubs which can contribute substantially to a more balanced diet. After wintering on coarse shrubs, wildlife relish the lush vegetation found when a sagebrush-grass type has a good balance of palatable grass and forbs in the composition.

5. Rodents. There does not appear to be any effect on mice, but similar rodents tend to decrease. Studies by Johnson and Hansen in Colorado on sagebrush-grass range and grass-forb range showed the density and litter size of deer mice were little affected by the use of 2,4-D at two and three lbs. per acre acid equivalent. The density of pocket gophers and least chipmunks was reduced while the montane vole increased. With reestablishment of forbs on the treated sites, the pocket gopher and montane vole populations returned to pretreatment levels (28). Turner, reporting on a 19-year study in Colorado, concluded that ranges could be improved either by poisoning and trapping gophers or by using 2,4-D (58).

6. Sage Grouse. As stated earlier, sage grouse desire certain densities and size classes of sagebrush in their seasonal habitats. When sagebrush increases beyond this point the quality of their habitat is reduced. Following treatment, excess sagebrush is replaced by other desirable plant species, some of which are vital to the welfare of the young chicks.

IV. ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

A. AIR

Because of volatilization and evaporation, a small amount of herbicide may remain suspended in the air for a short period of time following application. Since 2,4-D is rapidly broken down by organisms and photo-decomposition, this impact is small and short lived.

B. SOIL

Some of the applied 2,4-D will eventually reach the soil. However, at the concentration used, 2 pounds or less acid equivalent per acre, any impact on the soil will be temporary. The 2,4-D is readily broken down by plant metabolism, soil micro-organisms, hydrolysis, photo-decomposition, and chemical decomposition (23, 36). The loss of sage-brush might result in a temporary increase in soil displacement due to raindrop splashing action on bare soil, but the rapid increase of other vegetation coupled with interception by dead sagebrush plants more than offsets this hazard. See discussion under Part II, B.

C. VEGETATION

Policy of the Forest Service Intermountain Region is to make a qualitative and quantitative evaluation of each project area before treatment and to follow up with further evaluations two years and five years after treatment. Continued analysis of this data gives a reliable index as to vegetative response. These measurements show that some desirable plants are killed. However, there is no evidence that any one plant species, even those plants highly susceptible to 2,4-D, has been permanently eliminated. The greatest impact occurs immediately after treatment, but plant species tend to regain their ecological status in a few years.

D. WATER

The maximum amount of 2,4-D expected to enter water is .01 ppm when two pounds acid equivalent per acre is applied in the conventional diesel carrier (46). Use of lighter concentrations should reduce this amount proportionately. Intermountain Region hydrologists are of the opinion that there will be no detrimental effect on water production. See section II,D, for further discussion in water contamination.

E. SOUNDS, SMELL, ESTHETICS, AND HUMAN HEALTH

The sounds of the helicopter and pumps are short lived and will be gone as soon as the project is completed. The smell of 2,4-D is short lived and disappears within a few days depending on temperature and weather conditions. The appearance of sagebrush is not suddenly changed after spraying. By fall of the first year defoliation is apparent. Most

change takes place during the first winter, and by the following spring the treated area is dominated by dead sagebrush stalks. This appearance is gradually changed as snow and animals break down the dead stalks and other vegetation dominates the scene.

There is little if any hazard to human health if the chemicals are used as prescribed (22). The hazard is primarily accidental exposure of 2,4-D concentrate to the skin or eyes of workers handling the chemical. When "flaggers" are used, they are located at each end of the flight strip. The flagger stands long enough for the pilot to line up with him and then quickly moves out of the way. There is some contact with the spray mixture in some instances. This chemical is readily degraded and does not pass up the food chain (22).

F. ANIMALS AND BIRDS

The only known potential hazard to birds and animals is the possible damage to habitat. The planning process is geared to recognizing all potentially adverse impacts and then modifying the program to eliminate the serious ones. The possibility exists that some impacts may not be recognized. At the present time there are no known rare or endangered species that will be adversely affected by the proposed spray program. See section II, H for more complete discussion of potential impacts. Section I, D described ecological systems involved and criteria used in attempts to reduce impacts to a minimum.

V. ALTERNATIVES TO THE PROPOSED ACTION

This environmental statement has been prepared to describe the use and potential impacts of 2,4-D on a portion of the sagebrush-grass and wyethia-grass types. With many years of experience in management techniques, stocking levels, mechanical treatments, and approximately 20 years experience in application of herbicides, we believe that the use of the plant growth regulator 2,4-D is a highly viable alternative to use on selected acres which amounts to approximately 17 percent of the total area dominated by sagebrush and wyethia. Other cultural treatments such as burning and chaining would have limited potential on these selected areas because of special conditions that must be present before they are effective. These conditions will be explained under the proper alternative heading.

A. PRESCRIBED BURNING

Prescribed burning as used here is defined as the application of fire to sagebrush stands under predescribed conditions of weather, fuel moisture, soil moisture, wind intensity and direction, and numerous other factors that will allow confinement of the fire to a predetermined area, and at the same time accomplish the objective of sagebrush removal with minimum damage and acceptable cost. There are two periods during the year when burning can be effectively done--early spring and midsummer.

Early spring burning must be accomplished shortly after snow has left and before any plant greenup occurs. Soil moisture and ground fuel moisture must be high to avoid destruction of nontarget vegetation. High winds in the proper direction and sufficient dry fuel to carry the fire must be present. Natural barriers or firelines must be so situated as to confine the fire to the target area. The size and configuration of the burn area must be such that impacts above the tolerable level would not occur. Three prominent potential impacts are destruction of other improvements, injury to intermingled desirable shrubs or trees, and displacement of critical habitat. All of the required conditions seldom occur at the same time.

Midsummer burns are highly hazardous and require considerable precautionary preparation to confine the fire to target areas. Prescribed conditions peculiar to each site must be present. Potential impacts are essentially the same as for spring burning, but their occurrence is likely to be more severe.

Free-burning fires (wildfire) has always been a part of the ecology. Ecologists consider wildfire to be a significant factor in creating the habitat within which native wildlife evolved. Civilization has been a major influence on reducing the effect of fire. Highways, green belts, heavy grazing, and effective fire prevention and control measures have all altered the fire ecology.

Prescribed burning is an effective but seldom used tool for vegetative manipulation. When the necessary conditions exist and burning appears to best meet the management objectives of a specific area, it becomes a highly viable alternative.

ALTERNATIVE A - PRESCRIBED BURNING

	Environmental Effects		
	Favorable	Adverse	Other Factors
Air		Smoke output adds to visual pollution.	Burning has high level of limitations and can only be used effectively when conditions are favorable.
Soil	Causes faster recycling of nutrients formerly tied up in sagebrush plants.	Increases soil exposure to wind and water erosion temporarily. Hot fires destroy favorable litter accumulation for two to five years and may cause crusting to surface (12).	Firelines may be a severe impact on soil. Rehabilitation is needed after burning.
Vegetation	Forbs tend to recover faster (12, 41). Nutrients are released for use by plants. Removes decadent overstory and promotes root sprouting of some shrubs.	Nonselective. Top-kills plants that are resistant to 2,4-D. May kill bitterbrush (41). Hot fires completely kill many plants. Risk of burning nontarget areas. May make area vulnerable to heavy big game use, thus adding impact to sprouting shrubs. Temporarily destroys habitat for most forms of wildlife. Usually complete loss of sagebrush.	Usually requires nongrazing year preceding burn so that dry vegetation can carry fire. Requires nongrazing use the year following fire to assure recovery of desirable plants. After recovery period burned areas compare favorably with other treatment methods.
Water		Possibility of increased erosion adding silt to streams. Large accumulations of ash create lye in water.	

ALTERNATIVE A - PRESCRIBED BURNING (Cont.)

	Environmental Effects		
	Favorable	Adverse	Other Factors
Visual	Few dead sagebrush plants to be seen. May increase number of flowering plants.	Burned area is not esthetic. There may be smoke pollution. Burned areas are more obvious from greater distance.	Burned area may remain green for longer period of time year following fire.
Sounds Smell		Smoke travels off site.	Control noise is probably higher than herbicide application. Very difficult to schedule.
Human Health & Economics		Inhalation of smoke and irritation of eyes. Risk of escape, thus burning improvements. Accidents.	
Animals & Birds	Forbs recover faster.	Loss of food and cover first year. Small forms of wildlife may be burned. Not compatible with sage grouse nesting areas. Removes habitat for certain birds and small forms of animals.	New growth attracts some species of wildlife.
Microclimate		Temporary change of microclimate - greater than 2,4-D.	

Prescribed burning can be a useful tool and is employed when benefits are determined to offset losses. Prescribed burning, like other alternatives, has a place when conditions are favorable.

B. CHAINING OR RAILING

Chaining and railing have been employed extensively. Chaining has, with few exceptions, replaced railing. Chaining is done by connecting approximately 300 to 400 feet of anchor chain to two large crawler tractors. With a tractor connected to each end of the chain, the chain is pulled in a "U" or "J" shape. Generally sections of railroad rail are welded to each link creating rough surfaces for scarification. Severity of the scarification treatment is usually regulated by chain weight, repeated treatment, distance between tractors in relation to chain length, or a combination of these.

Only a small percentage of the area proposed for herbicidal treatment would qualify for chaining. For chaining to be effective on sagebrush removal, the plants must be brittle so that the plant can be broken off or pulled up. The majority of the area proposed for herbicidal treatment contains mostly sagebrush plants that are too flexible to be effectively removed by a chain without destruction of many other desirable plants (to be effective the area would have to be chained over several times at increased cost).

The cost figures shown in section I, G, 5, b are for large projects where the cost of moving chains and tractors can be amortized over a large acreage of approximately 1000 acres or more. Chaining small projects would raise the cost considerably. The majority of the herbicide projects contain less than 500 acres and are dispersed over a large area.

When it is desirable to plant other species after partial removal of sagebrush, chaining provides an excellent seedbed and is generally used providing the sagebrush competition can be reduced sufficiently for seedlings to establish.

ALTERNATIVE B - CHAINING OR RAILING

Environmental Effects			
	Favorable	Adverse	Other Factors
Air		Often creates dustclouds.	
Soil	Breaks down shrubs placing more litter on the soil surface.	May turn up boulders that are normally partly buried. May subject soil to erosive action by wind for short period of time.	Use is limited to relatively flat terrain with little or no rock.
Vegetation	Severity of kill of desirable plants can be regulated. May rejuvenate decadent desirable shrubs.	May activate dormant seeds of unwanted plants. May break down desirable shrubs, thus requiring root sprouting. Shrubs must be mature and woody before chains can do effective control job. This limits use on many sites.	Little or no change in fire hazard.
Water			Sediment production generally insignificant.
Visual	Less noticeable dead brush after recovery.		Area looks badly torn up for about one year.

ALTERNATIVE B - CHAINING OR RAILING (Cont.)

	Environmental Effects		
	Favorable	Adverse	Other Factors
Sounds Smell		Noise period much longer.	
Human Health and Economics	Less chance of chemical injury.	More expensive to use. Difficult and expensive to transport equipment. Limited supply of equipment. More chance for physical injury due to lifting.	Nature of accidents may change. Anchor chains are very expensive to build and maintain.
Animals & Birds		May injure or kill small animals. Requires use during non-nesting period.	2,4-D is not considered to be injurious to animals in concentrations used.
Micro-climate			Probably similar to use of 2,4-D.
Cultural		Requires special planning and treatment of area when archeological materials and sites are in the treatment area.	

C. PLOWING

Plowing is seldom an alternative to spraying sagebrush because plowing requires reseeding while spraying is employed when total plant removal is not desired and reseeding is generally not needed. Plowing is usually employed when plant composition is such that other treatment methods are not adequate to meet land management objectives. Watershed restoration is frequently a major objective when plowing is employed.

ALTERNATIVE C - PLOWING

	Environmental Effects		
	Favorable	Adverse	Other Factors
Air		Often dusty.	
Soil	Breaks up hard surface crust. Tends to break up gully patterns.	High erosion hazard compared to other methods. Limited to smooth, boulder-free terrain.	

ALTERNATIVE C - PLOWING (Cont.)

	Environmental Effects		
	Favorable	Adverse	Other Factors
Vegetation	Better control of undesirable plants that are resistant to 2,4-D. Provides seedbed when seeding is needed.	Kills nearly all vegetation. Requires seeding in all cases. Cannot establish diversity of species that are in the natural plant community.	
Water		May temporarily create high level of siltation.	
Visual	Less dead brush showing.	Soil almost completely bare about one growing season.	
Cultural		Requires special planning and treatment of area when archeological material and sites are in the treatment area.	
Sound Smell		Sound period much longer.	
Human Health & Economics		Most expensive to use. Equipment is expensive and has high maintenance level. Requires high-powered tractor. Near complete loss of wildlife habitat during recovery period.	
Microclimate		Complete change in microclimate.	

D. USE OF A DIFFERENT HERBICIDE

There are many herbicides that will do the control job desired; however, 2,4-D has proven to be the most economical. Most other herbicides have a longer residual life and tend to be less selective for use on target species. Use of other known and tested chemicals for the intended purpose is not considered to be a viable alternative. Development of new herbicides may some day replace 2,4-D for this use.

E. USE OF A DIFFERENT FORMULATION OF 2,4-D

See discussion under II. - Planned Measures to Minimize Environmental Impact. The Intermountain Region has used many formulations of 2,4-D. Two basic low volatile forms are esters and amine salts. Esters and amine salts respond differently.

Amine Forms

1. Tend to have longer residual life (39).

2. Tend to have erratic effect on target species.

3. Tend to require more pounds per acre to obtain similar results of ester forms.

4. Tend to be noncompatible with invert emulsions when used in small quantities per acre.

5. Tend to be more stable than esters.

Ester Forms

1. Tend to be more volatile than amine forms.

2. Tend to give more uniform control.

3. More compatible with invert emulsions.

F. BIOLOGICAL CONTROL

There are no known practical methods of biological control specific to target species even though some insects such as Aroga websterii present some possibility.

G. INTENSIVE RANGE MANAGEMENT WITHOUT SAGEBRUSH TREATMENT

This alternative is employed to the extent possible regardless of other treatments applied. Intensive livestock management, with or without cultured or chemical treatment, will be the prevalent practice employed to maintain the range environment in a desirable condition or to rehabilitate deteriorated ranges. Grazing sagebrush range with sheep during fall and winter season has been used successfully to reduce sagebrush density, but has limited possibilities. Chemical and mechanical treatments are used to assist recovery of ranges that are in unsatisfactory condition and in maintaining some vegetative types in a seral stage to provide greater returns to society.

It is estimated that approximately 60 percent of the sagebrush type occurring in the Intermountain Region would benefit from herbicide or mechanical treatment. The FRES data bank shows 1,483,000 acres (60%) of the sagebrush land in Idaho on National Forest and National Grassland as being in the lowest of three condition classes. Forest officers have estimated that only 17 percent would qualify for herbicidal treatment after being subjected to the environmental planning process. At the present rate of herbicidal treatment it will take more than 35 years to treat the 17 percent for the first time. In addition, it is estimated that herbicide control will be effective for an average of 20 years or more. Any retreatment will prolong the program.

H. TAKE NO ACTION

This is not a viable alternative, when deteriorated conditions exist and practices that are environmentally sound can be employed to hasten recovery. The Forest Service is charged by law to manage National Forests and National Grasslands on a sustained yield basis. When deteriorated conditions exist, they must be corrected. In this case the alternative of taking no action does not meet the objective of sustained yield management, when benefits outweigh the impacts.

This alternative would have the advantage of not causing impacts created by other alternatives. It would also preclude realization of the benefits derived from range land improvement by other alternatives.

In a number of instances this alternative would require considerable reduction in livestock production, thus a considerable loss to the local economy. Where rehabilitation is needed to curb accelerated erosion, the erosion would continue until the slow processes of nature could be effective.

VI. RELATIONSHIP BETWEEN SHORT TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE OF LONG TERM PRODUCTIVITY.

Vegetative modification is an integral part of an overall long-term productivity program. On grazing allotments, intensive grazing management systems are being employed. These systems are designed to improve or maintain vegetative composition, forage quality and quantity, improve or protect the soil and its hydrologic function, and enhance, where possible, values for other uses. On poor condition ranges intensive management helps improve conditions, but when high densities of less palatable and highly competitive species occur, such as sagebrush and wyethia, improvement by intensive management alone is slow and may preclude the realization of the management objectives for the overall program.

The long term productivity of areas treated with 2,4-D is improved by developing a plant community capable of holding the soil in place. Once soil is lost from a site, productivity goes down. Development of additional soil from parent material is a very slow process.

As stated elsewhere in this statement, a balanced composition of many plant species has more ability to withstand catastrophic occurrences than a simple plant composition. For example:

1. Insects and disease generally affect only a few plant species at any one time. A complex plant composition provides a variety of habitat conditions for natural predators to control insect buildup. If one plant species is affected by disease, other species are there ready to occupy the site left by the plant killed from disease, thus keeping bare soil areas to a minimum.

2. A productive variety of plant species form many kinds and variations of habitat for wildlife and domestic livestock. These habitat differences better provide for a larger variety of uses without the uses being in serious conflict with each other.

3. Wyethia has a short growth period. It generally matures early in the summer and then dries up. When a dense stand of this plant has matured and dried, considerable soil is left exposed to high intensity storms that are common during July and August.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This program will cause no known irreversible or irretrievable commitment of resources.

VIII. CONSULTATION WITH OTHERS

A. ANALYSIS OF COMMENTS RECEIVED ON THE DRAFT STATEMENT

1. General. Ninety-six copies of the draft statement were mailed out for comment. In addition, a notice of the availability of the statement was sent to fifty-nine newspapers with distribution in Idaho. Thirty-six responses were received with comments regarding the statement. Nineteen replies came from Pocatello, five from Boise, two from Idaho Falls, two from Moscow, and one from Caldwell, Idaho, in addition to seven from State and Federal agencies.

A major portion of the unfavorable comments were based on a misinterpretation of the data presented in the statement, i.e., all of the sagebrush would be sprayed in a twenty-year period, all of the forbs would be eliminated, and wildlife would be seriously affected. It is also apparent that some of the critics believe that domestic livestock should not be allowed to graze on public lands.

Where additional information was furnished or clarification was indicated, the statement has been revised to include these items.

The draft statement was based on the premise that the cumulative effect of treating 17 percent of the sagebrush acreage with 2,4-D over a 35-year period and the controversial use of 2,4-D should be evaluated in an environmental statement. All of the predicted environmental impacts and effects described in the draft and final statements are based on the firm premise that needed protective measures will be taken in planning each project, applying the treatment, and in followup management. Also, an environmental analysis will be prepared for each project prior to approval, to fully evaluate the impacts involved. We do not agree with the premise advocated by some that environmental statements must be filed on a project-by-project basis.

We reject the comments based on issues not germane to the proposal as described. Also, we have not responded to comments that were too general or which pertained to an entirely different issue.

2. Federal Agencies

a. Environmental Protection Agency by Sheldon Meyers, Director, Office of Federal Activities, Washington, D. C. The E.P.A. was of the opinion that the draft statement has adequately described the impacts and included appropriate precautionary measures.

b. Soil Conservation Service by Guy W. Nutt, State Conservationist, Boise, Idaho. This agency had only three editorial comments. No further comment is needed.

c. Intermountain Forest and Range Experiment Station by Dr. Neil C. Frischknecht, Ogden, Utah. Dr. Frischknecht was highly favorable to use of 2,4-D for managing the range resource. His comments have been noted and, where appropriate, included in the final statement.

3. State Agencies

a. State of Idaho - State Planning and Community Affairs Agency by Karl Tueller, Associate Director for Intergovernmental Coordinations. No comment was made concerning the draft statement.

b. State of Idaho - State Board of Land Commissioners by G. C. Trombley, State Land Commissioner. Mr. Trombley considered the statement ". . . to be a very complete discussion of the herbicide control program." "I compliment you and your staff on presenting such a fair appraisal of the environmental impacts. . . ."

c. State of Idaho - Idaho Fish and Game Department by Joseph C. Greenley, Director.

(1) The department interpreted the statement as a blanket authorization of using 2,4-D with little or no consideration being given to other alternatives. This assumption is not entirely correct. Other alternatives are being used when their use is judged to best meet the objectives of the given project. Most of the project areas proposed for herbicidal treatment are less suitable for chaining or burning treatments.

(2) The Department contends that ". . . spray has fallen into areas which were to be protected for wildlife." We have continually improved techniques to assure that the treatment is confined to the planned target areas. There has been some difference of judgment between Forest officers and State Fish and Game officers as to which areas should or should not be treated.

(3) The Department objected to the term 'controlling sagebrush and wyethia might best be compared with "weeding a garden."' This terminology was questioned by a number of people. It is being omitted since it added little to the statement. The intent is to treat sagebrush and wyethia on selected areas when they occur in near pure or dominating stands to the exclusion or injury of other desired plants. Control should be emphasized instead of total elimination. In section II. C. 1., it is pointed out that 70 percent control is considered more optimum than the previous 90 percent obtained.

(4) The Department contends that planning is complete before their biologists have been consulted. This may have been true several years ago. Because of coordination problems between the two agencies, an extensive "Memorandum of Understanding and cooperative Agreement" was agreed to by both agencies in August of 1966. This

document was supplemented in March of 1968. The agreement provides for the Forest Supervisor to submit to the Director by July 15 of the year preceding the proposed treatment, a map and description of the proposal. The Department is to submit their comments to the Forest Supervisor by October 20 of the year preceding the proposed treatment. As stated in section I. C., the planning and evaluation of projects takes several years and continues through an extended period of time.

(5) Threetip sagebrush is one of the species of sagebrush preferred by deer. The Department contends that it shouldn't be sprayed at all. Section I. D. 1. a. (2)(f), of the statement recognizes this value. However, there are many areas where deer are not dependent on this plant and its density is inhibiting the potential production of other plant species that are being used and depended on by other biota. There are instances where this species is invading strutting grounds of sage grouse. In the area east of Dubois, Idaho, (not on National Forest land), a dozer was used to clear brush from strutting grounds. In some of these areas the use of herbicide may be just as effective and much cheaper.

(6) The data furnished by the Department regarding sage grouse nesting has been incorporated into the statement.

(7) The paragraph referred to in section I. D. 2. a. (1) specifically refers to "brood habitat" and "brood ranges." The Department wanted this made clear.

(8) The Department stated, "We would be hesitant to approve any spraying of sagebrush on fall use areas." The Forest Service, too, would hesitate to spray these areas and would do so only after careful planning. Section I. D. 2. a. (1) (e) second paragraph, stated "On depleted ranges, sage grouse are dependent upon not only restoration of the grass-forb resources, but also upon restoration and preservation of some sagebrush."

(9) Data supplied by the Department regarding antelope fawning has been incorporated into the statement.

(10) The Department states that the first paragraph in section I. D. 2. b. (2) is misleading in that forbs and grasses are often unavailable to deer in winter and they depend on sagebrush. The statement clearly states, "With few exceptions, they (deer) depend heavily on sagebrush, especially species of the low sagebrush group."

(11) The Department takes exception to the second paragraph in section I. D. 2. b. (2). This paragraph pertains specifically to the Department's own report. The Department's statement that all other forage will be removed by livestock is conjecture. Our livestock management plans provide for adequate forage for grazing wildlife.

(12) The Department emphasized that bighorns use forage other than grass. Section I. D. 2. b. (4) regarding bighorn sheep clearly points out that bighorn sheep utilize other plant species besides grass.

(13) The Department pointed out a lack of information regarding birds, small mammals, and aquatics. They did not furnish any data for inclusion in the statement, but these parts are strengthened with additional information obtained from other sources. Reliable data regarding songbirds in relation to the application of 2,4-D is difficult to obtain. At the present time the Forest Service is cooperating with the Utah Cooperative Wildlife Research Unit and Utah Division of Wildlife Resources to obtain additional data regarding blue grouse, insects, and songbirds. Perhaps the International Biological Programme will eventually publish data on this subject.

(14) The Department infers that streamside vegetation is sprayed. Apparently, they ignored the discussion in section II, parts D. H. and J., and especially item 9 of part J. - "The size of spray areas is reduced by having 100-foot or more untreated strips adjacent to streams, lakes, ponds, and sensitive nontarget vegetation types."

(15) The Department states that 2,4-D has microbacidal properties and suggests that it can inhibit the functioning of rumen microbes. We have no knowledge of the referred-to research, but studies by the Agricultural Research Service as described in their publications, Product Research Report No. 137, 1972, and Research Note Vol. 20, No. 12, 1972, do not indicate that any problem would exist unless very high quantities of 2,4-D are fed to ruminants. Such quantities are not possible at the rate used on Forest Service spray projects. See Tables 2 and 3 in the final statement.

(16) The Department contends that the importance of tall sagebrush for antelope fawning is not mentioned. Section I. D. 2. b. (1) states "During the first few weeks after birth, fawns require low scattered shrubs for cover, and in most cases, sagebrush fills that need." Data furnished by the Department has been included in the statement.

(17) We agree, in part, with the Department that some plants used by young sage grouse chicks are injured by spraying at least the first year on the area actually sprayed. This is one reason why spraying is done in patches and why wildlife biologists' recommendations are necessary in planning projects. These expected impacts must be within tolerable limits before 2,4-D should be used. Frequently, other alternatives such as chaining are used on such areas. These are some of the reasons why Forest officers have estimated that only 17 percent of the sagebrush would qualify for herbicidal treatment as outlined in section V. G.

(18) The Forest Service agrees with the Department that "sustained yield" is applicable to wildlife as well as to livestock and to other resources.

d. State of Idaho - Cooperative Extension Service by Robert E. Higgins, Extension Agronomist. Mr. Higgins was complimentary on the draft statement and stated that it was complete, fair, and reasonable.

4. Organizations and Individuals

a. Idaho Woolgrowers Association by L. M. Williams, Executive Secretary. Response was highly favorable and complimentary to the statement proposal.

b. Idaho Environmental Council by Dr. Donald R. Johnson, Department of Biological Sciences, University of Idaho, Moscow, Idaho. Dr. Johnson offered data regarding rodent populations and this has been included in the statement. He questioned the 20 or more year life expectancy of the projects. He based this on a study by Hansen and Ward, 1966, in Colorado Agricultural Experiment Station Tech. Bull. 88, 20 pp., where they showed that Artemisia cana (mountain silver sage) required only six years to return to pretreatment levels. This species is seldom a target for 2,4-D application on Forest Service projects because of its management problems. The discussion in section I. D. 1. a. (2) (e) pointed this problem out.

Dr. Johnson did not offer any protest to the program or indicate there would be any serious impacts not recognized in the statement.

c. ADA County Fish & Game League (Committee Report) by Bruce Bowler, Chairman. This committee report recommended rejection of the Draft Environmental Statement for a number of reasons. Many are simply statements of opinions. Other are so general in nature that meaningful response is not possible. Response is, therefore, made on those contentions that appear to pertain to the material presented in the draft statement.

(1) The committee contends that irretrievable or irreversible commitments will result. This is a matter of degree. Individual plants are definitely removed but no species have been known to be lost. The vegetation present produces seed or reproduces vegetatively. Only dense patches of sagebrush and wyethia are target areas. Less than 17 percent of the total sagebrush-grass acreage is being considered for herbicidal treatment over a 35-year period. The objective is to reduce density of target plants by approximately 70 percent. Additional data describing pristine sagebrush conditions is being added to the final statement so that the results obtained from application of 2,4-D can more easily be put in proper perspective in relation to pristine conditions.

(2) We know of no reason why use of 2,4-D should be restricted to tropical conditions as proposed by the committee. We believe application of 2,4-D on Forest Service projects is precise to the degree necessary. Use of helicopters, groundrigs, flags, flagmen, thickening additives, temperature and wind restrictions, and untreated buffer strips are used to control precision of application.

(3) The committee contends that an environmental statement should be prepared for each spray project. The Forest Service fully intends to comply with the environmental policy act and guidelines related thereto. Most projects would not require an environmental statement according to the law. Preparing statements for each project would only serve to bog down the process. Statements for each project would result in approximately 20 statements each year for southern Idaho alone. Further, each project has the benefit of a detailed study by several specialists and a detailed environmental analysis report is made for each project. A required statement in each environmental analysis report is a determination as to whether or not an environmental statement is needed. To make this determination prior to making the environmental analysis would be prejudgment not based on factual information. See section I. E. - ORIGIN OF THE PROPOSAL.

(4) Additional information is added to the final statement covering aquatic biotics. The committee's contention that streamside vegetation is destroyed. ". . . as witnessed over the State of Idaho from past spray projects." is not clear. They must be referring to projects on non-National Forest land or early day projects. It is the intent that Forest Service spray projects will be kept removed from streams and lakes.

(5) Forest Service personnel are aware of some publications relating to the ability of plants to fix atmospheric nitrogen, thereby improving the nutrient level for other plants to use. Dr. Raymond Farnsworth in the Soils Department at Brigham Young University, Provo, Utah, has recently published a paper on this subject. Also, another good source of information on this subject can be found in the Journal of Range Management, Volume 17, Number 2, pp. 73-74, by Doctors Vlamis, Schultz, and Biswell. It should be clarified that most of the nitrogen fixation ability comes from a symbiotic relationship between the plant and nitrogen fixing bacteria.

(6) The committee objects to classifying target sagebrush as a weed. This has been deleted from the statement.

(7) The committee states that the objective of the Statement is to increase livestock numbers on public lands. This is not true. The objective is clearly stated in the first paragraph of section I. B. As a result of the treatment, approximately 40 percent of the additional vegetation can be used as forage for livestock and wildlife. Increased

forage available for livestock use will be used to reduce the impact on overstocked ranges, and only forage excess to other needs will be allocated to additional livestock.

(8) The committee contends that "The past spraying of antelope fawning areas well demonstrates the damage received." The discussion regarding antelope in sections I. D. 2. b., and III. G. 3., recognizes the relationship of sagebrush and antelope.

(9) The committee contends that the economic analysis is false and misleading. See discussion on this subject in response to Drs. Holte, Maughan, Trost , and group which follows.

(10) The committee contends that technical input to satisfy full community response should not be focused on land grant educational institutions. Actually, technical input was solicited from several Federal and State agencies and any individual that cared to have technical inputs as well as university staff. As stated previously, ninety-six copies of the statement were mailed out and an advertisement was sent to fifty-nine newspapers having distribution in Idaho. All persons that requested a copy of the statement were furnished a copy from this office and other Forest Service officers were furnished 65 copies for public review. The mailing list contained in the draft statement was lengthened considerably after printing of the statement.

(11) The committee contends that grazing of livestock on public land should be removed. Livestock use is specified in the basic laws under which we are directed to administer and manage National Forest lands.

d. Northern Rockies Chapter-Sierra Club by William R. Meiners, Chairman. Mr. Meiners rejected the draft statement proposal as ". . . entirely biologically untenable in its implications and application." He attached a copy of the ADA County Fish and Game League Committee Report as the position of the Sierra Club. Response to this report has been previously made.

e. Golden Eagle Chapter of the National Audubon Society by H. William Belknap, President. Mr. Belknap furnished a copy of the ADA County Fish and Game League Committee Report and went on record as supporting the report. Mr. Belknap believed that each situation should be evaluated on its own merit, apparently as described in section I. C. He also stated "Certainly, we are not against the use of sprays where, after careful consideration of alternate means, this is the most suitable and least damaging to the environment."

f. Patricia Packard, Department of Biology, College of Idaho, Caldwell, Idaho. Miss Packard presented an interesting comment on ecology and stated a number of questions, some of which are answered in the statement or in response to other comments and many defy answering within the scope of an environmental statement.

Miss Packard infers that livestock would not be reduced to the capacity of the range. Proper stocking and management is a part of the management planning required prior to approval of the project. Intensive management, planned rest, and structural controls are all a part of the management planning. Discussion in sections I. C., and V. G., pertain to livestock management.

Miss Packard states she wished to protest this impact statement particularly on two points: (1) That the citations of literature are biased in favor of the report and that some papers were intentionally omitted, such as the one by Hutchison. Hutchison's paper is cited in the final statement. It should be noted that this paper is a research note based on one winter's study comparing snow accumulation characteristics between a sagebrush type and a natural grass type at 9,500 feet elevation. Hutchison found that there was still some snow persisting between sagebrush plants for a short while after it was gone on the pure grass type. He did not present data relative to evaporation or soil moisture on the two types. It is impossible to cite all authors dealing with the subject. The authors cited have all cited other authors. An interested reader could develop an almost never-ending reading list of publications. There are many authors that point out that shrubs and trees delay snowmelt. Many also point out that tall vegetation intercepts a considerable amount of precipitation and the moisture then evaporates before it ever reaches the soil. (2) Miss Packard makes the accusations that an emotional approach was used to sway or distract the reader. This was definitely not the intent of the authors nor do we believe the statement conveys such an approach. The statement she cited as objectionable has been omitted in the final statement.

g. The comments from the following groups and individuals can be responded to jointly because of the similarity in contentions. Many of the contentions have been covered in response to other comments and will not be repeated here. In response to the following groups' comments, the text of Drs. Holte, Maughan, and Trost is largely used.

Karl E. Holte, PhD.
Biology Department
Idaho State University
Pocatello, Idaho

Dr. Ralph Maughan, Vice President
Southeast Idaho Environmental Council
Idaho State University
Pocatello, Idaho

Dr. Charles H. Trost, President
Pocatello Audubon Society
Idaho State University
Pocatello, Idaho

David M. Arcano, President
Idaho State University Wilderness Club
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Martha Benson
Pocatello, Idaho

Bill Brooks
Pocatello, Idaho

William and Judith Byers
Pocatello, Idaho

Mark R. Collie
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Robert E. Dixon
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Mr. and Mrs. Glenn R. Downing
Idaho State University
Pocatello, Idaho

Mr. and Mrs. Kent Durst
Pocatello, Idaho

Carol Foley
Idaho State University
Pocatello, Idaho

Flora J. Folmsbee
Pocatello, Idaho

Julia Haveland
Pocatello, Idaho

Jean Henderson
Idaho State University
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Dan McBride
Idaho State University
Pocatello, Idaho

Roger Olsen
Idaho State University
Pocatello, Idaho

Stanley H. Vegors, Chairman
Citizens Environmental Council
Pocatello, Idaho

A large number of the above individuals inferred that all of the sagebrush on National Forest land would be treated in a 20-year period. A life expectancy of 20 years or more was used in order to obtain a discount figure from the interest tables. Part V. G., clearly explains that only about 17 percent of the sagebrush acreage is being considered for herbicidal treatment over a 35-year period.

The group generally contends that all of the forb component, or a major part of it, will be lost due to the use of herbicide. Part II. C. 3., of the statement points out that a decrease in forb production is experienced on most, but not all, projects for the first several years after the application of 2,4-D. Part of this decrease is a direct loss of individual plants and part can be attributed to a change resulting from increased competition from other plants that are allowed to increase due to decrease in competition for soil moisture from sagebrush.

The group generally refers to conditions found on the Curlew National Grassland and especially to crested wheatgrass. Comparing plowed land to native range will show great differences in species composition. Herbicide is used but very selectively on the Curlew National Grassland. Other alternatives of chaining and prescribed burning are also used with chaining being predominant of the cultural treatments.

The Curlew National Grassland is a very small part of the total program area. In many respects the Curlew National Grassland is an exceptional area. This area was formerly private homesteads where farmers worked to make a living at dryfarming and all of the native vegetation was removed when the cultivated area was in grain production. During the "Dust Bowl Period," many areas throughout the

West were purchased by the Federal Government. The Curlew National Grassland is one of these areas. The Soil Conservation Service, USDA, was assigned the task of revegetating the cultivated areas and managing the area to demonstrate grassland agriculture. Because of the near desert-like character of the area, it was difficult to find useful plants adapted to the area that had a readily available seed source. Crested wheatgrass filled this need and was used to revegetate the abandoned farmlands.

Since 1954 the Curlew National Grassland has been administered by the Forest Service. Passage of the Multiple Use and Sustained Yield Act put this area under multiple use management as well as having a mission to demonstrate grassland agriculture.

Even though the Curlew National Grassland is largely different from other National Forest lands, much research data would apply to this area. Considerable data has been collected on the area itself.

Several members of this group and others objected to calling stands dominated by sagebrush and wyethia as "near pure stands." The group is apparently construing this to mean pure stands with other species not present. Species composition of a given area can be expressed in many ways. It can be given in terms of relative abundance of each species, by the frequency that a given species occurs along a transect, or many other methods. Since the Forest Service deals primarily in supplying pounds of forage, it generally expresses species composition in terms of pounds (airdry) produced per acre on an annual basis. To overcome variations in climatic conditions, several years production may be averaged together to arrive at a long-term level of production. Data collected in one year may vary greatly from the long-time average. When a species is producing a very high percentage of the total annual production on an area, it is referred to as a near pure stand or a stand dominated by the species involved.

We agree with Dr. Holte that a large number of species can be found in most habitat types. We also agree that plowing an area and seeding a few species can greatly affect the species composition or number. We do not agree that spraying changes the species number, but it does change the composition in relation to production.

Dr. Holte makes reference to a Stauffer Chemical Company brochure on 2,4-D. The Forest Service is aware of the contents found on chemical labels and of the hazards involved. He points out that 2,4-D should not be used near crops. The Forest Service agrees that crops should be protected. Idaho State Law restricts the use of ester formulations to rangeland areas at least one-fourth mile from cropland.

Reference was made to Table 1 in the statement as being biased and that this was the only study cited. Part II. C. 3., cited other studies including analysis of results of 17 Forest Service projects. Additional data has been supplied in the final statement. Dr. Holte provided a long list of plants that were mentioned in the statement and

contends that they are seriously injured by 2,4-D. Many of the species mentioned by Dr. Holte are not sprayed because they occur in a different vegetative type or their location is eliminated from the treatment plan. Many of the species listed by Dr. Holte are very difficult to kill with 2,4-D. Data from a great many Forest Service spray projects agree in general with Blaisdell and Mueggler's findings.

A number of individuals commented on the $2.00 grazing value charged under the prescribed burning alternative in part I. G. 5. This charge is prorated over a pasture that is rested from grazing to provide dry fuel to carry the fire. The total loss of grazing in the pasture was then assigned to the acres actually burned which is a small part of the total pasture acreage. This charge is additional to that needed for other alternatives. Plowing needs an additional two or three years rest to allow new seedlings to become established after planting.

Dr. Maughan and others contend that the statement is inaccurate in places. We agree that conflicting conclusions may be drawn from various research data. We have attempted to use the preponderance of evidence in preparing the statement and do not agree that the statement is inaccurate. The Forest Service has been collecting data on spray projects for more than 20 years and has consulted volumes of research papers showing results from numerous locations.

Dr. Maughan and others take exception to the 1971 value of $3.93 for an AUM of grazing. It is their contention that the actual grazing fee charged should be used. We rejected this because current grazing fees do not reflect all of the benefits involved. The $3.93 was the average value that livestock operators paid for rental of private rangeland for 1971 as computed from data furnished by the Economic Research Service, USDA. The 1972 value was set at $3.94 per AUM and the 1973 value is set at $3.98 per AUM. The rate is changed in the final statement to reflect current values and the interest rate is raised from 7.5 percent to 10 percent. We reject the proposal to charge an additional 5 percent interest to cover unknown factors.

Dr. Maughan takes exception to the decay rate of 2,4-D. We used the best reference we could find. Additional discussion is added to the body of the final statement section II.B.

Dr. Maughan listed a few other questions:

"Will esthetic values be protected?" The answer is yes! See section I. E., section II. parts E. and J., and section III. E.

"Will spraying take place in any of the inventoried undeveloped areas?" Probably so, but only after further evaluation of the areas and in conformance with the Environmental Policy Act.

"For how long will soil in sprayed areas be subject to erosion?" Spraying does not increase the erosion hazard. Sprayed sagebrush does not suddenly disappear and leave the area bare. Residual vegetation starts to respond immediately and protects the soil.

"What will be planted (or will anything) in the sprayed areas?" This will depend on the vegetation on each project. It is very rare that sprayed areas need seeding. On occasions adaptable species such as alfalfa, small burnett, clover, or some other species are seeded for increased wildlife benefits.

Dr. Maughan asked why not remove livestock from the range and let it recover naturally? It is not necessary or desirable to totally remove livestock. Intensive management is practiced with planned rest built into the grazing formula. Experience has shown that total removal of grazing does not cause recovery of the range much faster than moderate grazing.

h. The content of comments received from the following are similar to comments received from others that have been responded to.

Mr. Ernest E. Day
Boise, Idaho

Mr. Dennis J. Jensen
Idaho Falls, Idaho

Mr. Gerald Jayne, Vice President
Idaho Environmental Council
Idaho Falls, Idaho

Mr. Dale Taylor, President
Southeastern Idaho Rod and Gun Club
Pocatello, Idaho

Mr. Jayne asked for considerable additional information regarding past and future herbicide projects. He is being referred to the Forest Supervisor of each National Forest for this specific information.

i. University of Idaho - College of Forestry, Wildlife and Range Sciences by Dr. E. W. Tisdale, Associate Director, FWR Station. Dr. Tisdale was complimentary on the draft statement and stated - ". . ., I have read through the document since that time and am impressed by its thoroughness and comprehensive handling of the problem involved." By other communication Dr. Tisdale requested several copies of the final statement for use at the University. These copies will be sent to Dr. Tisdale.

B. AGENCIES, GROUPS, AND INDIVIDUALS TO WHOM THE FINAL STATEMENT WILL BE SENT

1. Federal Agencies

Mr. William M. Hoffman — 3 copies
Office of Pesticides Programs
Environmental Protection Agency
Washington, D. C. 20460

Mr. James L. Agee
Environmental Protection Agency
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Seattle, Washington 98101

Mr. Bruce Blanchard, Director — 18 copies
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Mr. William Mathews, State Director — 10 copies
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Agricultural Research Service - USDA
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Utah State University
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Mr. Guy W. Nutt, State Conservationist
Soil Conservation Service - USDA
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2. State Agencies

Mr. Oscar C. Arstein, Commissioner
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Mr. Joseph C. Greenley, Director
Idaho Fish and Game Department
600 South Walnut Street
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Mr. Gordon C. Trombley, Commissioner
Idaho Department of Public Lands
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Mr. Karl Tueller, Associate Director
Intergovernmental Coordination
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Mr. Gerald A. Ingle, President
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3. Organizations, Groups, and Individuals

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Idaho Environmental Council
c/o Dr. Donald R. Johnson, Assoc. Prof. of Biology
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Mr. H. William Belknap, President
Golden Eagle Chapter
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Ms. Patricia L. Packard
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

26 DEC 1972

Mr. John R. McGuire
Chief, Forest Service
U.S. Department of Agriculture
Washington, D.C. 20250

Dear Mr. McGuire:

We are pleased to comment on the draft environmental impact statement for your program on the control of sagebrush and wyethia in the National Forests and grassland areas of Idaho.

Our review indicates that the herbicide, 2,4-dichlorophenoxyacetic acid, the only chemical to be used, will be applied in accordance with Federally registered labels. The program as described in the impact statement contains the appropriate precautionary measures to assure the protection of humans, wildlife, and desirable species of vegetation.

We favor this type of program where the herbicide is applied to small sites leaving large areas of untreated land between them. Such a practice should not impose any long-range adverse effects on the environment. The resulting effect is a heterogeneous sagebrush community interrupted by monotypic grassland and is an example of good conservation practices.

We thank you for the opportunity to review this draft environmental impact statement. Would you please send three copies of the final statement to Mr. William M. Hoffman, Office of Pesticides Programs, Environmental Protection Agency, Washington, D. C. 20460.

Sincerely yours,

Sheldon Meyers

Sheldon Meyers
Director
Office of Federal Activities

JAN 2 1973

8

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
Room 345, 304 No. 8th Street
Boise, Idaho 83702

January 8, 1973

Mr. Vern Hamre
Regional Forester
Forest Service
324 25th Street
Ogden, Utah 84401

Dear Mr. Hamre:

Reference is made to the draft environmental statement describing the proposed practice of herbicide control of sagebrush and wyethia in southern Idaho by the Forest Service which was referred to us for review and comment. We have the following comments to make:

Page 4, paragraph two, line 10: The descriptive term "stable plant communities" has to be relative. Even native plant communities are continually changing.

Page 8, paragraph two: Affected Birds and Mammals -- What is the status of rare or endangered species of animals?

Page 46: Killing vegetation by means of a herbicide is an irreversible and irretrievable commitment of a resource.

We appreciate the opportunity to review and comment on this proposed project.

Sincerely,

Peter W. Taylor (acting)

Guy W. Nutt
State Conservationist

FOREST SERVICE

INT-Provo

REPLY TO: 1630 Written Information

December 7, 1972

SUBJECT: Comments on environmental statement

TO: James P. Blaisdell, Assistant Director
INT-Ogden

The environmental statement on use of herbicide on sagebrush and Wyethia in Idaho is similar to the one for Utah on which I sent comments to Oliver Cliff on October 6. Some of the following items were not mentioned in my October 6 comments, but they are applicable for the Utah as well as the Idaho statement.

Page 13 mentions use of cattle as a tool for range improvement by applying pressure to grass so that shrubs would benefit. Along the same vein, it has been demonstrated at both Dubois and Benmore that sheep grazing in late fall puts pressure on sagebrush which favors grass. I don't think that point should be overlooked in such a statement as this.

Sod-forming grass species such as Agropyron dasystachyum and A. smithii are greatly limited by sagebrush competition and they give tremendous response in both production and soil protection when released from competition with sagebrush.

Page 23. Although not included in this table, certain species of Castilleja, which are parasitic on the roots of sagebrush, are also killed by herbicidal spray of sagebrush. This happened at Benmore in 1965.

Page 29. B. SOIL : I am not sure that all of the items listed here are necessarily true. There is evidence that sagebrush contributes to soil improvement and that productivity of grass is higher on new seedings because of higher nitrogen content following sagebrush than when grass stands become old. Dr. Raymond Farnsworth in the Soils Department at Brigham Young University claims to have found nitrogen-fixing nodules on roots of sagebrush at certain times of the year.

Page 41. F. BIOLOGICAL CONTROL: I should mention that we have an article in press to the Journal of Range Management (might appear in the November issue) titled "Voles can improve sagebrush rangeland" by Frischknecht and Baker, in which we describe how grazing can be manipulated to take advantage of peaks in Microtus populations to reduce brush.

I think the point should be stressed in all of these environmental statements that use of herbicide is an important tool for manipulating vegetation. It is imperative that this tool be at the disposal of resource managers along with other tools such as fire, biological control, chaining, plowing, etc. One tool will not apply to all conditions or situations, and in many circumstances a combination of the tools mentioned is necessary to achieve desired ends.

NEIL C. FRISCHKNECHT
Project Leader

RECEIVED
DEC 8 1972
Range Experiment Station

CECIL D. ANDRUS
GOVERNOR

GLENN W. NICHOLS
DIRECTOR

STATE OF IDAHO

STATE PLANNING AND COMMUNITY AFFAIRS AGENCY
BOISE, IDAHO 83707

November 30, 1972

Mr. Vern Hamre, Regional Forester
Federal Building
324 25th Street
Ogden, Utah 84401

Dear Mr. Hamre:

The State Clearinghouse has reviewed and have no comments concerning the Forest Service draft environmental statement for herbicide control of sagebrush and wyethia in Idaho.

Sincerely,

Karl Tueller

Karl Tueller
Associate Director for
Intergovernmental Coordination

KT:cs

IDAHO
DEPARTMENT OF PUBLIC LANDS
BOISE, IDAHO 83707

GORDON C. TROMBLEY
COMMISSIONER

STATE BOARD OF LAND COMMISSIONERS
CECIL D. ANDRUS
GOVERNOR AND PRESIDENT
PETE T. CENARRUSA
SECRETARY OF STATE
W. ANTHONY PARK
ATTORNEY GENERAL
JOE R. WILLIAMS
STATE AUDITOR
DELMER F. ENGELKING
SUP'T OF PUBLIC INSTRUCTION

November 30, 1972

Mr. Vern Hamre
Regional Forester
U. S. Department of Agriculture
Forest Service
324 - 25th Street
Ogden, Utah 84401

Dear Mr. Hamre:

This department has reviewed the U.S.D.A. Forest Service Environmental Statement, Herbicide Control of Sagebrush and Wyethia in Idaho as requested.

The environmental statement appears to adequately consider the negative factors as well as the favorable effects. I consider it to be a very complete discussion of the herbicide control program.

This department has no specific comments to make at this time. I compliment you and your staff on presenting such a fair appraisal of the environmental impacts of chemical control of undesirable vegetation.

Very truly yours,

G. C. TROMBLEY
State Land Commissioner

GCT:vp

CECIL D. ANDRUS, Governor
COMMISSION
ROBERT G. KALB, Sandpoint
PAUL C. KEETON, Lewiston
JOHN EATON, Cascade
JACK HEMINGWAY, Sun Valley
H. JACK ALVORD, Pocatello

IDAHO FISH AND GAME DEPARTMENT

JOSEPH C. GREENLE
Direct

December 14, 1972

POST OFFICE BOX
600 SOUTH WALNUT STREE
BOISE, IDAHO 837

Mr. Vern Hamre
Regional Forester
Federal Building
324 25th Street
Ogden, Utah 84401

Dear Vern:

The Idaho Fish and Game Department has completed its review of the U.S.D.A. Draft Environmental Impact Statement on Herbicide Control of Sagebrush and Wyethia in Idaho. Although the intent of this statement is apparently to cover the application of the herbicide 2, 4-D, the text of the statement deals more with the removal of sagebrush and wyethia and the effects it would have on the environment rather than just the effects of 2, 4-D on terrestrial and aquatic species. It would therefore, appear that the statement was prepared more to cover the removal of sagebrush and wyethia to provide additional forage in the form of grasses rather than the effects of 2, 4-D itself.

It has been the Department's position in the past to recommend alternatives, such as burning and chaining, rather than spraying. We feel there is less detrimental impact to wildlife species in using these methods as well as providing positive control on retaining critical areas important to wildlife. We therefore, do not support the blanket authorization of using 2, 4-D as such authorization may result in little or no consideration being given to the other alternatives of brush removal.

In reviewing the text of the statement, we found several factors that we are not in agreement with or were not included. We did not cover all issues of contention but dealt primarily with what we felt to be the major areas of concern. Our comments are as follows:

SUMMARY SHEET

IV. Environmental Impacts

In evaluating several past projects, we have observed that, despite careful planning, application, and supervision, spray has fallen into areas which were to be

protected for wildlife. We consider these effects to be serious and far from being negligible.

Page 2, Paragraph 2. The comparison of controlling sagebrush and wyethia to "weeding a garden" is misleading, as it implies that the target plants are weeds, a classification that depends on one's point of view.

As used here "other native species" seems to be synonymous to "grass." Since the intent is to establish additional grass stands, then it should be stated as such.

A. Definitions

2. Range allotment or pasture boundaries are apparently the primary consideration for project boundaries. Nothing here relates to the wildlife use areas that should also be considered.

C. Origin of Proposal

If the project is part of a grazing allotment management plan where a wildlife management plan is included, why is it that it becomes necessary for the Department to recommend modifications or object to a project on the grounds it is detrimental to wildlife?

Past experience has shown us that state wildlife biologists generally have not been consulted in the planning stages but are called on for recommendations after the project has been drafted and the budgeting for the project approved.

D. Ecological Systems

(f). Three-tip Sagebrush - Page 7, Paragragh 5

From mule deer food habit studies conducted in Idaho, it was concluded that three-tip sagebrush was preferred over other sagebrush species with which it was associated. Because of its palatibility, this species should not be sprayed at all.

2. Affected Birds and Mammals.

(b). Spring and Summer

The strutting ground is generally located near a suitable nesting area. Most nests in Idaho occur within a 3 mile radius of strutting grounds, however, in areas of poor nesting habitat, nesting has occurred as much as 8 miles away. On-site vegetative inspection is necessary to determine the probable nesting radius. Cocks may strut in what is not immediate surrounding nesting habitat.

Average height of 230 nest plants (sagebrush) studied in Idaho is 28 inches. Average diameter of the bush is 3.3 feet. Average canopy cover at nest site is 29 percent. (Based on 302 nests).

Page 9, Paragraph 2. It should specify that they are discussing brood rearing habitat which differs from other use areas.

(c). Fall

Grass-forbs are not key on fall ranges. We would be hesitant to approve any spraying of sagebrush on fall use areas.

(4). Predatory Birds. Page 10, Paragraph 4

The total removal of a sagebrush canopy to which rodents and other species are dependent would expose them to greater predations but would also permanently remove them due to loss of suitable cover. Such losses would force predatory birds into other areas where food would be available. This could result in a reduced population of birds of prey.

b. Mammals

(1). Antelope. Page 10, Paragraph 5.

Fawning cover observed in Idaho is big sage occurring in draws with average height of 2-3 feet and approximately a 30 percent canopy cover.

(2). Mule Deer. Page 11, Paragraph 1.

This statement is misleading since forbs and grasses are often unavailable to deer in the winter. Therefore, the more shrubs available on a winter site the better. If a decrease in sagebrush is offset by an increase in more desirable shrubs it may be beneficial, but since the overall objective of a spray program is to decrease brush strands to increase grass, the end result is a loss of mule deer winter range.

Page 11, Paragraph 2. The removal of any sagebrush on deer winter ranges, regardless of density of canopy can be considered detrimental. The spray program is designed to increase forage for livestock, not wildlife. Any additional forage produced by spraying will eventually be consumed by livestock, generally prior to the time game animals arrive on the range. How then, can it be construed that the removal of sagebrush and the replacement of other species (which will be consumed by livestock) can be highly beneficial to mule deer?

(4). Bighorn Sheep. Page 12, Paragraph 2.

Although most spray projects are not on bighorn sheep range, it must be pointed out that other forage species besides grass are essential to their needs. The reduction of protein producing plants would not be to their benefit.

(5). Moose. Page 12, Paragraph 5.

Moose are associated with willow and aquatic areas during portions of the year but do move out of these areas into select wintering areas. The statement

that moose habitat is not included in spray areas is incorrect as it has been included in past projects.

Not included under Birds and Mammals are the numerous small mammals and birds that are associated and dependent upon the sagebrush community. The impact that the removal of sagebrush would have on those species is significant and should not be ignored.

We have not attempted to evaluate the impact on rare or endangered species which are found in areas of southern Idaho where sagebrush and wyethia are found.

There was no mention of the effects that spraying would have on the aquatic environment and fisheries. Losses in streamside cover providing protection to fish as well as shade for maintaining water temperatures have occurred in past projects and create adverse effects to this portion of the environment. The overall effects this would have on fish populations was not explored.

F. Social, Environmental Objectives

As implied in this paragraph, the values to wildlife are secondary to the primary purpose of increasing forage supplies for livestock operations on public lands.

If spraying resulted in a direct benefit to wildlife, projects would have been proposed by wildlife agencies for this purpose. The proper use by livestock on some game ranges may be beneficial, however, stocking rates, use periods, and location of sites are all critical and if not managed properly would result in reduced wildlife populations using an area.

Page 15, Paragraph 6, last sentence. This sentence should be deleted as it implies that the increase in sage grouse populations is due to sagebrush spraying projects. There is no proof of such.

II. ENVIRONMENTAL IMPACTS

H. Animals, Birds, and Insects

Page 26, Paragraph 1. Wild animals are generally on the project before, during, and immediately after spraying. At the levels used, 2, 4-D may not be toxic to wild animals, however, 2, 4-D has microbacidal properties and recent research in Colorado suggests that it can inhibit the functioning of rumen microbes and could therefore, be detrimental to ruminants on the area shortly after spraying.

III. FAVORABLE ENVIRONMENTAL EFFECTS

G. Animals

2. Elk. Page 30, Paragraph 6.

Elk can benefit by increased stands of grass provided this forage is not consumed by livestock prior to the time elk move into the area.

3. Antelope. Page 30, Paragraph 7.

The importance of tall sagebrush for fawning purposes is not mentioned. A 30 percent canopy cover is more favorable.

4. Mule Deer. Page 31, Paragraph 2.

Who is to say deer are not required to use sagebrush to the extent it makes up 45 percent of their diet? The Cassia deer herd is utilizing 50 percent plus of sagebrush and thriving. Of importance is the availability of more than one species of sagebrush. Bitterbrush is not necessarily the salvation of every deer herd and has been overpublicized throughout the west.

6. Sage Grouse. Page 31, Paragraph 4.

Desirable plant species for young chicks are generally lost the first year following spray. What is used to offset this loss where these plants are vital to their welfare?

V. ALTERNATIVES TO THE PROPOSED ACTION.

The Department supports the use of prescribed burning or chaining where the reduction of sagebrush is deemed necessary. The "timing" of these projects as well as protection of forbs and other plants are pretty well assured. Costs should not be the determining factors in deciding whether one of these treatments or 2, 4-D should be used.

H. Take No Action

Page 42, Paragraph 2. When wildlife populations are going to be detrimentally affected by a project, the Department would recommend that no action be taken or modification be made in the project to lessen the impact. The "sustained yield" should be just as applicable to wildlife needs as it is to livestock.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Unless the project is adequately planned and no errors or mishaps occur in the application of spray, the statement that "no known irreversible or irretrievable commitment of resources will occur" may be somewhat correct. Past operations have shown us that this is not always the case. Improper management following spray

can also result in irretrievable losses.

We appreciate the opportunity afforded us to comment on the draft copy of this document. We encourage your consideration of the comments and suggestions we have made in your preparationof the final Impact Statement.

Sincerely,

IDAHO FISH AND GAME DEPARTMENT

Joseph C. Greenley
Director

cc: Russell E. Train

COOPERATIVE EXTENSION SERVICE

University of Idaho
College of Agriculture
In Cooperation with the
U.S. Department of Agriculture

634 Addison Ave. W.
Twin Falls, Idaho 83301

January 15, 1973

The Honorable Russell E. Train, Chairman
Council on Environmental Quality

Dear Sir:

The USDA Forest Service Environmental statement concerning herbicide control of sagebrush and Wyethia in Idaho prepared in accordance with Section 102 (2) (C of P.L. 91-190) for the inter-mountain region of the U.S. Forest Service has come into my hands very recently.

I have reviewed this statement and wish to compliment the U.S. Forest Service on their preparation of the very complete environmental statement. I also feel they have taken a fair and reasonable position trying to point out the pros and cons of a sagebrush control program using herbicides. The 2,4-D method of controlling or reducing sagebrush stands has been very benefitial to the rangelands of Idaho. Those areas that have an under-story of grass and are being used not only by wildlife but also by sheep and cattlemen to graze their livestock are particularly improved. I hope this statement will receive a favorable reaction on your part and others who will make the final decision as to the continuance of a sagebrush spraying program.

There is no one approach to maintain suitable environment that is perfect. Due to past abuses of some of our range areas, sagebrush has increased in population and in some areas there is no other vegetation but sagebrush. These areas are essentially sterile for wildlife and have no value what so ever for grazing.

Intensive education and action programs have been followed by livestock associations in certain areas of the state. The University of Idaho Extension Service has done considerable educational work on the techniques of applying 2,4-D for the control of sagebrush and offers advice to ranchers who are involved in sagebrush spraying programs.

Again, I encourage a response favorable to continued use of 2,4-D for the control of sagebrush on the areas of our Forest Service lands needing this treatment.

Sincerely,

Robert E. Higgins

Robert E. Higgins
Ext. Agronomist

REH/clm

R. J. RICH, PRESIDENT
BURLEY, IDAHO

PHIL SOULEN, VICE PRESIDENT
WEISER, IDAHO

L. M. WILLIAMS, EXECUTIVE SECRETARY
BOISE, IDAHO

Idaho Wool Growers Association

EXECUTIVE COMMITTEE
WESTERN DISTRICT
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EASTERN DISTRICT
RICHARD EGBERT, TETONIA
SOUTHERN DISTRICT
LAIRD NOH, KIMBERLY

17 BROADBENT BLDG.
PHONE 344 2271
BOISE, IDAHO 83701
MAIL ADDRESS BOX 2596

EXECUTIVE COMMITTEE
SOUTH-CENTRAL DISTRICT
JOHN FAULKNER, GOODING
EAST-CENTRAL DISTRICT
KENNETH WESTFALL, ABERDEEN

December 14, 1972

Vern Hamre
Regional Forester
324 25th Street
Ogden, Utah 84401

Dear Mr. Hamre:

We are pleased to have read the Draft Environmental Statement on Herbicide Control of Sagebrush and Wyethia in Idaho, issued by the Forest Service, Intermountain Region.

We feel the Forest Service Environment Statement to be an excellent coverage of the control of sagebrush and wyethia in Idaho. You have been accurate and correct in your presentation.

Anyone who has observed the job that has been done to control sagebrush and wyethia in Idaho cannot help but be pleased with the results obtained.

The most good to the most people in Idaho will be better achieved by continuing this program as outlined. We will have a better range for grazing, livestock, and wild game. It will also be much improved for sportsmen and other uses. These lands are needed for multiple use. Improving the grass cover as has been done adds considerably to the resources of the communities, the counties and the state of Idaho.

The Idaho Wool Growers Association commends you and the U.S.D.A. Forest Service for an excellent environmental statement and for conducting a program that means so much to the welfare of the citizens of Idaho. Buildin up the resources of Idaho as is being done by controling sagebrush and wyethia on the range lands where needed will surely add much benefit to all of our state.

We are hopeful the sportsmen, conservationist and environmentalist will join with the stockmen and support the Forest Service in their effort to improve the forest range lands in our state for all of the people. This will include grazing, wildlife, watershed, and recreational uses.

Sincerely yours,

IDAHO WOOL GROWERS ASSN.

L. M. Williams

LMW:dw

L. M. Williams, Executive Secretary

cc:

UNIVERSITY OF IDAHO

MOSCOW, IDAHO 83843

College of Letters and Sciences
DEPARTMENT OF BIOLOGICAL SCIENCES
208-882-3511 EXT. 9266

November 30, 1972

Mr. Vern Hamre
Regional Forester
U. S. Forest Service
324 25th Street
Ogden, UT 84401

Dear Mr. Hamre,

A representative of the Idaho Environmental Council has passed a copy of the Forest Service Environmental Statement on Herbicide Control of Sagebrush and Wyethia in Idaho to me for comment.

My graduate work at Colorado State University was directed toward determining the effects of range treatment with 2,4-D on rodent populations. I am heartened to note that the Forest Service has eschewed the policy of treating large blocks of sagebrush on a "try and see" basis, and that helicopters rather than fixed-wing aircraft will be used in applications to reduce drift.

My negative commentsareminor but perhaps worth noting:

1. I seriously question that the average site will take 20 years to return to a low production. Note that Hansen and Ward (Fig. 2 in the enclosed paper) found herbage production on an Artemisia cana site required only six years to return to pre-treatment levels.

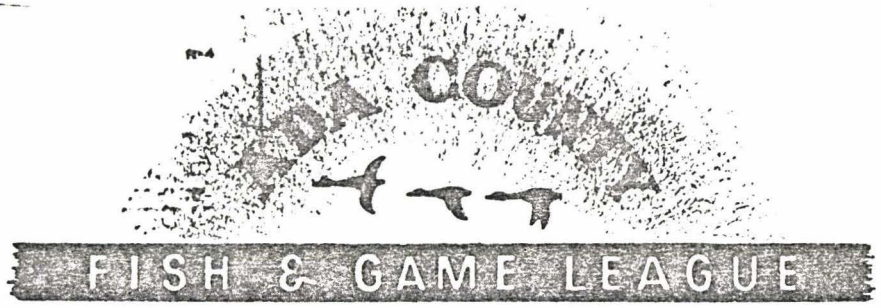
2. The statement on p. 31 that voles tend to decrease is incorrect as my study demonstrated that they are as much as 10 times as abundant on treated areas. I think that the discussion of 2,4-D effects on rodents might be expanded as these mammals serve as a major trophic level in food chains leading to raptorial birds, some of which have threatened status.

Finally, I would very much appreciate a copy of Gunnell and Phillips: Wildlife analysis of the White Cloud, Boulder and Pioneer Mountains, a publication from the Intermountain Forest and Range Experiment Station.

Sincerely,

Donald R. Johnson
Assoc. Prof. Biology

cc: Gerald Jayne, IEC
C. C. Warnick, WRRI



Member Idaho Wildlife Federation

BOISE, IDAHO

December 6, 1972

Vernon O. Hamre, Regional Forester
Federal Office Bldg., 25th St.
Ogden, Utah 84401

Dear Sir: In Reply to: #1940

Submitted herewith for the record and your consideration is a position statement regarding the USDA Environmental Statement on Herbicide Control of Sagebrush in Idaho.

Respectfully,

ADA COUNTY FISH & GAME LEAGUE

Franklin Jones

Franklin Jones, President

CC: Russell E. Train & others

ADA COUNTY FISH AND GAME LEAGUE

COMMITTEE REPORT

The committee appointed to review the USDA Draft Environmental Statement on Herbicide Control of Sagebrush and Wyethia in Idaho dated October 27, 1972, made studies thereof and now recommends that the following comments be made to Vern Hamre, Regional Forester, Federal Building, 324 25th Street, Ogden, Utah 84401, and to the Honorable Russell E. Train, Chairman, Council on Environmental Quality, under the Federal Environmental Quality Improvement Act of 1970.

The Ada County Fish and Game League has made a complete review of the "USDA Draft Environmental Statement on Herbicide Control of Sagebrush and Wyethia in Idaho," filed with the Honorable Russell E. Train, Chairman, Council on Environmental Quality from Regional Forester, Mr. Vern Hamre, Region 4, U.S. Forest Service. After thorough study this organization requests that this Environmental Statement be rejected for the following reasons:

Reasons For Position Statement

1. Blanket authority to spray approximately 15,000 acres each year of lands that are valuable for many resources for the purpose of growing grass for livestock is not in the best interest to the public which owns the land.

2. Although it is indicated that serious consideration is given to total environmental impact of the proposed spray program, no real evidence is included which will sustain this conclusion.

3. Various alternatives have been identified and discussed relative to brush control practices but in each instance this appears a superficial treatment with conclusions reached without supporting data to verify that toxicants are the most compatable method.

4. The concluding statement under part seven, page 46 "This program will cause no known irreversible or irretrievable commitment of resources" is biologically untenable.

5. The toxicant, 2,4-dichlorophenoxyacetic (240) acid, must be restricted to topical applications to specific species, applied on select areas, and in a precise manner on prescribed boundaries.

6. Prior to any application, a Critical Environmental Statement should be made to assure that each area is considered on its own merits.

7. Our organization challenges the viability of the trend of livestock oriented programs of sagebrush eradication for their predominent single purpose use on the public lands.

8. The Environmental Statement does not cover the effects of the toxicant on the streams and lakes, and fails to list references to any studies concerning the toxicant effects on the fisheries.

9. Streamside brush and trees needed for keeping water cool for fish protection are also killed by the plant poison as witnessed over the state of Idaho from past spray projects.

10. Recent published studies state that various desert plants including sagebrush have the ability to fix atmospheric nitrogen thereby improving the ability of all plants to grow.

11. The statement at page 2 classifies sagebrush as a "weed" while it has definitely been proven that on many Idaho and western winter ranges, over 50 percent of the deer winter diet is sagebrush, this demonstrates the biased tone of the report.

12. Objective of the Statement is to increase livestock numbers on the public lands when livestock numbers are already too high to be compatable with other users. Livestock grazed on the public lands represents only three percent of total national livestock production.

13. The spray program is supposed to be geared to an improved livestock management plan. Historically a spray program to be economically effective must be applied to those areas having good remnant vegetation. In these instances improvement is generally realized from the proper management of the livestock alone. (More rest and less use.)

14. Studies in Idaho show that big sagebrush occuring in fawning areas is used extensively by antelope for this purpose. The past spraying of antelope fawning areas well demonstrates the damage received. Even though sagebrush is used with other plants during other periods of the year, it is the dominant use plant during winter conditions by antelope.

15. Very few people would stop and take a picture of a sprayed hillside, it is, aesthetically incompatable with the scenery and degrades the beauty of the landscape.

16. The economic analysis of the Statement beginning at page 15 showing a calculated benefit - cost ratio of $3.23 to $1.00 is false and misleading as it is based upon grazing rentals received from private lands rather than the actual prices charged for livestock grazing on public lands. A true benefit - cost ratio could not show any benefits to the people who own the lands involved, but it would show loss to the public in violation of the equitable trust under which the Forest Service administers the public lands.

17. Technical input to satisfy the full community response as purportedly solicited by the USDA should not be focused on land grant educational institutions, in objective effort to counter act opportunity for bias and influence fostered by the livestock industry.

18. These are but a few of the reasons we could cite against this Environmental Statement. In summary we refer to an Article appearing in the August-September, 1971, Crops and Soils Magazine, pages 15 to 18. - - - It states - - - that sagebrush spraying presents several hazards;

"(1) the destruction of wide areas for production of feed and protection of wildlife.

(2) the highly potential erodible condition of the soil by wind in case of a sustained period of drouth, and

(3) an eventual reduction in yields of grass due to failure to capitalize on the potential increase in soil nitrogen under brush."

The December 1972 issue of the Readers Digest Article, Vol. 101, No. 608, pp 107-111, well reflects our thinking on the grazing of livestock on public lands. We are hopeful that through Environmental Statements that in the future public lands will come under proper management for the best use of <u>all</u> the people who own these lands and not the select few.

The Draft Environmental Statement should be accordingly rejected because it does not adequately treat the important environmental considerations required by the National Environmental Policy Act.

DATED: December 3, 1972

Bruce Bowler

Bruce Bowler, Chairman
244 Sonna Building
Boise, Idaho 83702

87

Northern Rockies Chapter
SIERRA CLUB

Snake River Plateau Group
Middle Snake Group
Montana Group
Spokane Group
Palouse Group

December 7, 1972

Honorable Russell E. Train, Chairman
Council on Environmental Quality
722 Jackson Pl. N.W.
Washington,D.C 20006

Dear Mr. Train:

The USDA Draft Environmental Statement on Herbicide Control of Sagebrush and Wyethia in Idaho dated October 27, 1972, was submitted for your review and appropriate action. The proposal is entirely biologically untenable in its implications and application. The position statement, as drafted by the Ada County Fish and Game League, provides a succint appraisal of the proposal. I urge its careful consideration and wholeheartedly endorse its recommendations.

Sincerely,

William R. Meiners

William R. Meiners, Chairman
Northern Rockies Chapter,
Sierra Club
7717 Ustick Rd.
Boise, Idaho 83704

CC: Vern Hamre
Congressional Delegates
Sierra Club
Audubon Society
Wilderness Society

BOISE STATE COLLEGE

SCHOOL OF ARTS AND SCIENCES

1907 CAMPUS DRIVE · BOISE, IDAHO 83707

December 11, 1972

Mr. Vern Hamre, Regional Forester
Federal Building
324 25th Street
Ogden, Utah 84401

Dear Mr. Hamre:

As president of the Golden Eagle Chapter of the National Audubon Society, I would like to indicate our strong desire to go on record as supporting the Ada County Fish & Game League Committee Report on the "USDA Draft Environmental Statement on Herbicide Control of Sagebrush and Wyethia in Idaho."

We feel that each situation should be weighed on its own merit and no blanket policies for spraying large tracts of public domain land for the eradication of insects or plants in this particular instance, should be given to any one agency. Certainly, we are not against the use of sprays where, after careful consideration of alternate means, this is the most suitable and least damaging to the environment. We would also like to point out certain other aspects for more elaborate consideration than was given in the Fish & Game League's Committee Report.

Sagebrush serves as an important escape cover for game birds, aside from the Sage Grouse Chukkars and Gray Partridges use it extensively and in times of deep snow the brush keep some of the snow from covering the grasses used for food which in some instances only survive the grazing effects of livestock by being protected under the canopy of the sagebrush.

Many non-game birds use sagebrush as nesting sights and if this cover is eliminated, so will the ecologic niche of the Brewer's, Sparrows and other desert species. Currently, we have laws prohibiting the collection of many of our wild flowers and certainly the use of such a non-selective herbicide as 2, 4-D would result in the eradication of many of our wild flowers from the sprayed or treated tracts.

As I mentioned earlier, sagebrush in areas of overgrazing protects grasses under the canopy and these are often the only grasses which are not removed from the range. In areas of overgrazing where the soil is especially compacted, the eradication of the sagebrush and Wyethia where the soil is not opened up by chaining, harrowing or some other method, then I feel that the loss of the top soil would be excessive as the grasse which may be seeded in the areas would probably not take hold. Certainly, in areas wher

conditions are such that chaining or other methods of sagebrush eradication are unfeasible due to steepness of slopes, type of soil, etc., then we feel that sagebrush eradication certainly should not be undertaken.

Sincerely,

H. Wm. Belknap

H. Wm. Belknap, President
Golden Eagle Chapter
National Audubon Society

HWB/cs

December 5, 1972

To: Vern Hamre

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From: Patricia L. Packard

Subject: USDA Forest Service Environmental Statement on Herbicide Control of Sagebrush and Wyethia in Idaho.

In this environmental statement the historical review of the dynamics of the sagebrush-grass biome does not provide sufficient perspective on the problem. It mentions that animals were present here in numbers at the time of early explorers. It does not go into distribution and numbers of grazing or browsing animals nor an estimation of the grazing pressure at that time. This is possibly deceptive in that, without further information, one might assume these to be grazing animals and the area of being capable of supporting great numbers of grazers. There is no mention in this environmental statement that as a region capable of supporting grazing animals, this was so marginal that buffalo were not able to permanently occupy the region west of Shoshone Falls. It was also not mentioned that when the horses of the trappers were brought in in the 1820's and early 1830;s to add to the grazing competition of the Indian horses with the buffalo, that the buffalo herds collapsed and became extinct mostly by 1834 and completely by 1840. This was twenty years before any real settlement of the region even began.

The role of fire in maintaining pre-settlement plant communities is not thoroughly investigated. At higher elevations fire may well have been the factor that swung the balance away from sagebrush. Fire is usually discounted in considering vegetational history in southern Idaho because Western Shoshone and Northern Paiute did not use it as a hunting aid as did Indians in other regions where fire played a part in vegetational history. This decision may be a little hasty. There is the possibility that at least the Paiutes used fire to encourage production of high seed-yielding annual plants. Townsend mentions this in his journal and it was a common practice among Paiutes in northern Nevada. It is also mentioned frequently in many journals that Paiutes set fire to the country as exploring parties passed through (scorched earth policy?). This minor increase in fire, added to uncontrolled "natural" fires in early days, could well have been sufficient to tip the balance of vegetation at higher altitudes to grass. What is spoken of as native plant communities in this environmental statement could well have been a temporary fire disclimax. Evidence for or against these "native plant communities" being true climax communities of any kind is not provided. Only an unwarranted assumption is made and it is presented as a basis for a management policy.

Another factor that is not clear is the time element. Because the historical review is so minimal it is easy to take the stand that this is an old problem predating present agency and management methods. The impression

is that this problem arose in the last century with management practices of the settlers. However, growth ring counts of sagebrush and juniper, which is part of this same problem, seems to indicate that on higher altitude ranges the woody plants germinated in the early 30's. The problem with which we are dealing, although it has long roots, goes back to a period in which three factors coincided: (1) low rainfall cycle, (2) initiation of fire control and (3) high grazing pressure beginning during World War I, which coincided with a high rainfall cycle, but was continued on without consideration for changing conditions.

The roots of the problem apparently started 12,000 to 8,000 BP when grazing mammals became virtually extinct. The plant communities were delicately balanced and the introduction of the horse about 1700 and domestic animals in the higher country sometime after 1860 put it close to the edge: the balance didn't tip however in the higher country until well within this century and the beginning of modern management practices. In light of this, reexamination of management practices is called for but apparently from the impact statement this is not being considered. Only the immediate benefits of the spraying program are really considered; long term effects of this and alternatives are not considered in any depth.

The reason for instituting this spray program is given as the desirability of shifting the vegetation to a complex stand to increase stability; the complex stands being buffered against catastrophy while pure stands are not. This is ecologically unsound. Pure stands are not the problem; they are the symptom and this program is being sold as a treatment and cure for a symptom. When an environmental factor is present in excess -- northern climate, infertile soil, drought, biotic impact -- vegetation will shift toward a pure stand. Inducing variability cannot change this; it will revert again to a pure stand plus increased deterioration of the range will occur. Under stable conditions, a reliable forage source permits survival and differentiation of herbivore species and the control effects fo this permit increased differentiation of forage (Whittaker, R.H. 1972. Evolution and measurement of species diversity. Taxon 21 (2):213-251). When differentiation of herbivore species is inadequate and the relationship is one of exploitation and not control, the relationship breaks down resulting in decrease in complexity and density of forage species. The end point of this cycle of deterioration is one predator species (e.g. cow) and one unpalatable prey species (e.g. sagebrush). The cure is to readjust the balance between diversity of herbivores and diversity of range vegetation; more kinds of herbivores (but less cows) will allow for and select for more kinds of forage and eventually more quantity which will allow for an increase in herbivores (cows and wildlife). This is a complicated relationship. (see Whittaker's article). The complexity of one segment of a community does not protect it from catastrophy. The complexity must extend to all segments of the community, otherwise the community is unstable.

A spray program judiciously used might help speed recovery of the range with rebalancing of the herbivore-range relationship. It easily could contribute to its further deterioration. Under fluctuating conditions, species in marginal niches tend to be lost. When the speed of fluctuation is increased the effect is unknown -- it may increase the rate of loss of species. Spraying in general reduces the number of shrubs and forbs; only grasses are enhanced. This would tend to improve community structure only if the following conditions are met:

1. The number of cattle is reduced to the carrying capacity of the range as it is.

2. Cattle are utilizing prefered grazing species only and are no longer also utilizing the browse species of the wildlife.

3. The release of grazing and browsing pressure is sufficient to allow recovery of at least some of the species being eliminated by past over-grazing, spraying and unstable conditions.

4. The recovery of the vegetation is sufficient to allow recovery of sod.

5. The improved vegetation and release of grazing competition is sufficient to allow a favorable shift in the ratio of herbivores to allow balanced use and therefore control of the range plants.

The implies wish to return to natural plant communities is, at the best, wishful thinking. The cow is now the dominant element in range land communities. It was not a part of the "natural" precivilization community. We can't keep the cow and have "natural plant communities" too. If we wish to keep the cow (which may not be justified if the figure that only 3% of our beef ever sees public range land is valid) we will have to either develop:

1. A new natural community with a diverse plant community maintained by a balance between cattle and browsing-grazing wildlife that will utilize components of the range not used by cattle and thereby exerting the control that selects for and maintains a diverse and stable ecosystem or ---

2. Feed energy into the system to artificially maintain an unbalanced nonselfperpetuating system composed of cattle and grazing species with all else being phased out.

If the trend continues for fewer and fewer beef cattle to roam the open public range, institution of #2 might eventually create a tremendous problem.

If sagebrush is removed by spraying without parallel alteration in grazing management, or even in some cases with it, there are several questions that need answering. The answers to some or most of these questions may be on the positive side but information on which any evaluation of these problems could be reasonably made was not provided by the impact statement.

1. To what extent do the relicts of the former complex communities owe their existence to the presence of sagebrush? Without its protection would they be completely destroyed by over use since the environmental statement implies grazing pressure is not to be reduced.

2. On this abused and perhaps eroded range, does the deep rooted sagebrush play a part in bringing minerals to the surface and adding them to the soil humus with its shed leaves where they are passed on to the grass? In some of the less fertile soils on higher altitude ranges is this possibly a crucial factor in recovery of abused areas overcoming the tendency of minerals to leach in eroded soil?

3. Is there any importance to the fact that deep roots of sagebrush reach a water source unavailable to grasses and forbs so that sage grows most all the season adding to the energy budget of the ecosystem. Since it is little utilized by grazing animals and only moderately by browsers, most of this adds to rebuilding the soil. Does a pure stand of sagebrush in the early stages of succession on abused range add to the stability of the ecosystem and increase the speed of recovery over what could be obtained by grass and forbs? Is this especially true because of their ability to utilize minerals out of reach of grass and forb roots, adding both humus and minerals?

4. Considering the sites occupied by various forms of Artemisia arbuscula, how permanent is any alteration of the vegetation by spraying here? Considering the forb damage and erosion during the transition period, is it worth it? How serious can the erosion problem on these shallow soils be?

5. How serious is the decrease in forb production? The environmental statement says studies have indicated the reduction is eleven pounds per acre but there is no indication of what this means. If forbs run 200 pounds to the acre it is serious. There also is no indication at what point in the recovery period forb reduction averages 17 pounds reduction. Some other data is given at the end of 20 years. If that applies here, again it is serious. There is little information on what forbs are affected and the role they play in nutrition of other domestic animals and wildlife. Not knowing this it is difficult to assess this whole problem. These ranges are said to be marginal for sheep range because of low forb production. What does further reducing forb growth do to sheep grazing? Is the reduction in forbs critical enough to affect wildlife? Is this mostly summer range that is to be sprayed which is not used to capacity by wildlife, or is some of it critically short winter range?

6. Shrubs in general seem to be susceptible to spraying, forbs are reduced; only grass is enhanced. This improves the range for cattle. Wildlife benefit indirectly in that with improved grass the cow will hopefully eat that instead of the prefered browse species. Wildlife also has the unsprayed areas which hopefully will be relieved of some cow pressure by the more attractive sprayed areas. Will these benefits equal, exceed or be less than the losses to wildlife from spraying? If wildlife is hurt

by spraying, how can it be hoped to establish a stable diverse community by reducing the diversity of the browsers who complete the feedback control mechanism? If this is surplus summer range area for wildlife, would stability be enhanced by improving winter range for the wildlife so their number is increased on the summer range and it can be utilized more fully, thus starting to establish a balanced community with feedback control mechanisms insuring some degree of stability?

7. Some oblique references were made to test areas in which grazing pressure was removed but no information was provided. What is the effect of reducing the number of cows to the carrying capacity of the range as it now stands and allowing it to recover? On paper, this is feasible because sagebrush relies on moisture resources below the reach of grass. Apparently sage increases when grass is removed because more water is able to percolate through the soil reaching the lower level (Daubenmure, R.F. 1970. Steppe vegetation of Washington. Wash. Ag. Ex. Sta. Tech. Bull. 62). If the native grass growing in the refugia of the sage were allowed to expand their ranges to the interstices between the sage, would that reduce the amount of water reaching the lower levels of the soil and thereby reduce the amount of sage? Would this method retain the value of sage mining minerals at a lower depth in what is probably eroded and depleted soil at least to a degree, adding minerals and humus to the soil in leaf fall and avoid the erosion and leaching that would occur on a denuded sprayed area and at least minimize the loss of species from marginal habitats during a period of unstable conditions? At the same time, forb and shrub production would be maintained and with it the diversity of wildlife could be maintained or improved thus reestablishing one component of the feedback control mechanism. Which handling of the problem produces the greatest stability, net gain in energy and benefits to <u>all</u> components of the community?

I wish to protest this impact statement particularly on two points. The citations used to back up the statements in this paper are almost entirely on the side showing the spray program is of lily white benefit. Papers indicating any evidence to the contrary are not cited even if they have been done by the Forest Service itself. One example is the statement that grass derived by spraying will improve snow retention. Not cited is any literature presenting evidence that sagebrush delays snow melt (including: Hutchinson, B.A. 1965. Snow accumulation and disappearance influenced by big sagebrush. U.S.F.S. Res. Note RM-46). Failure to weigh the evidence on both sides coupled with the lack of evidence on important points makes it impossible to come to any conclusion on the worth of this project.

Perhaps less serious but much more upsetting is the emotional appeal which was thrown out all through this environmental statement presumably as a distraction to "preservationists" -- or something. The fact that the wildflowers that bloom in the spring will be more visible with all that old sagebrush out of the way will probably appeal to some little old ladies in tennis shoes and they will never notice that the section on wildlife sounds so nice because it was written according to the philosophy that if you don't have something nice

to say, don't say anything at all. And the back-to-nature pitch with the return to the natural plant communities will appeal to some starry-eyed young things in waffle-stompers and they won't ask how this pre-civilization natural plant community is going to support all those unnatural cows. But the only effect on this hard-bitten, middle aged dame in beat up field boots is the weary feeling that she is being sold another bill of goods.

Reference: Letter of 12/9/72 from
Dr. Karl E. Holte, Associate
Professor of Botany, Biology
Department, Idaho State Univ.
Pocatello, Idaho 83201

Pages 4, 15, 16, 17, and 18 are not reproduced here because of the problem of legibility of the documents received. Page 4 was a specimen label for 2,4-D Dimethylamine, U.S.D.A. Register Number 476-909, and the other pages were taken from some publication describing uses of various herbicides. All were published by Stauffer Chemical Company.

Pages 11, 12, 13, and 14 were livestock and recreation use statistics, and are not reproduced because the data contained is irrelevant to the statement. The pages were taken from U.S. Department of the Interior, BLM - 1970 - Public Land Statistics and the U.S. Department of Agriculture, 1971 - Agricultural Conservation and Forestry Statistics.

December 9, 1972

TO: Regional Forester Vern Hamre
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FROM: Dr. Karl E. Holte
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SUBJECT: The purpose of this statement is to comment upon discrepancies and biases in the USDA Draft Environmental Statement on Herbicide Control of Sagebrush and Wyethia in Idaho (Sept. 1972).

Page 4. B. Purpose

I agree with paragraphs 1 and 2 of this section. Large populations of animals were once able to live without apparent destruction of range and environment prior to white man in this area. White man, through ignorance, destroyed much of not only the plant communities, but also the soil and streams.

Paragraph 3: The statement that "plants such as sagebrush and wyethia increased to near pure stands" is in error. Nowhere have I found in southern Idaho pure stands or even communities which approach pure stands--except where man has sprayed or plowed. Where overgrazing has occurred in Curlew Valley, on Scout Mountain in Bannock County, in Fremont, Teton, and Madison Counties on the west slope, or in Harney County, Oregon, species diversity remains at 50 species at least of plants and usually the number is upwards of 90 species. Where plowing or spraying and subsequent seeding has occurred, the species diversity is reduced in extreme cases to four or five species (e.g., the area between Cedar Hills and Wild Cat Hills south of Snowville, Utah) or usually 15-30 species which are widely scattered, the new dominant being not sagebrush or wyethia but crested wheat grass. I have successfully challenged and continue to challenge anyone to show me an area which is pure sagebrush or pure wyethia that does not have a previous history of spraying or plowing.

Page 4. C. ORIGIN OF THE PROPOSAL

The expertise of specialists referred to in the second paragraph too often includes exclusively those oriented toward cattle and sheep production. People who want a balanced environment which includes plant and animal diversity, provisions for game animals, and provisions for the small "funny birds" are not included as specialists. Those who value an area for its potentials of hiking, camping, hunting, fishing, painting, or birdwatching must write letters on their own time, but not be paid to act as consultants, as are the "range managers," which too often in the past has meant "cattle range managers."

Pages 4-12. ECOLOGICAL SYSTEMS

A statement under 1.a. implies that the dominance of sagebrush is bad. I question why the dominance of an introduced grass such as crested wheat grass is not equally bad or worse after spraying has reduced the density and diversity of herbs that were there prior to spraying and reseeding.

Page 6. (c) "Sites currently occupied by low sagebrush groups are often important range areas for big game and sage grouse. Each site is evaluated on its own merits . . . ." If this is the case, why is blanket permission to spray 15,000 acres being asked for? Each area to be sprayed, whatever its plant community, should have to file an environmental impact statement. Blanket spray permission should not be given.

Page 6. (2) The Big Sagebrush Group. Investigations have shown that such tall sagebrush are important deer winter range food and that there is a high correlation between antelope fawning areas and tall sage. Indiscriminate killing of such sagebrush by an aerial application of spray will destroy such calving or fawning grounds, winter ranges, and again the 90 or more other species found with the big sagebrush.

Page 7. (c) Mountain big sagebrush. In each area of poor use by man this is said to increase. Let's first stop these practices of bad use--then let's consider remedies. Overgrazing now continues--e.g., Curlew Valley, Idaho, where topsoil is lost each year because adequate ground cover cannot recover after intensive grazing. Spraying will not only kill the sagebrush but will also kill the many forbs which prevent such erosion. The area will need to be sprayed again soon if such overgrazing continues, because the sagebrush will not have the competition of the plants killed by spraying and the overgrazing. The taxpayer will be stuck with the regimen of overgrazing-spraying-overgrazing-spraying until all the soil is lost. Before taxpayer money is spent upon sagebrush removal, abuse should be stopped.

Page 7. B. Wyethia. Both species are said in this report to increase with overgrazing. This is an admission of bad management. Where Wyethia is on the increase, application of spray is only a treatment of symptoms. The cause of the increase should be stopped. No mention is made of the value of Wyethia as a big game food. Only casual mention is made of its suitability for grouse habitat.

Page 8. Affected Birds and Mammals. No mention is made of mourning doves. Trost and Olsen (1971-72) found that doves nested almost exclusively in those areas which had not been disturbed by plow or spray. Those areas which were plowed or sprayed within the last 25-30 years were not utilized by doves for nesting.

Page 10. (4) Predatory birds. Systematic scientific observations by Trost, Olsen, and Powers in Curlew Valley (1971-72) indicated that there are significant effects on predatory birds. Nesting, hunting, and use of areas that had sagebrush eradication programs by plow or spray were not as heavily utilized by predatory birds as those areas which were chained or left alone.

Page 11. (2) Mule deer. "A wide variety of understory species and other shrubs is also necessary." Spray destroys this variety. Chaining and fire do not destroy variety, but do reduce the high sagebrush.

Page 13. E. OTHER DEMANDS.

"There is increasing pressure from people of the metropolitan areas to use public lands." See my Table 2, page 12. The public does not utilize crested wheat fields. They come to enjoy aspen stands, sagebrush fields, and those areas which have diverse vegetation which support diverse animal populations. It is not democratic to destroy the natural diversity and produce fields of crested wheat for a few cattlemen by spray application.

Page 13. F. SOCIAL AND ENVIRONMENTAL OBJECTIVES

Strong Field in Curlew Valley is a good example of what happens under rest-rotation practices. This area is no longer productive to big game, small game, or for tourist and metropolitan people to enjoy.

The last paragraph of this section seems to ignore the warnings of the manufactures of 2,4D (See Stauffer Chemical Company brochure, page 4.) How can animals of the sprayed area avoid breathing or getting the spray on themselves or in their eyes? These animals must live in the area 24 hours each day and depend upon the area plants for their food. They cannot avoid ingesting the 2,4-D which is on the plant parts. The warnings state "DO NOT feed threshings or graze treated fields to livestock." Yet wildlife is expected to survive while eating treated plants. "Excessive amounts of 2,4-D in the soil may temporarily inhibit seed germination or plant growth." A temporary inhibition may mean death to plants which are in critical balance. ". . . even minute quantities of the spray may cause severe injury during both growing and dormant periods." It is folly, then, to assume that only sagebrush and wyethia will be eradicated. Again, experience has shown that all forbs are affected and their densities greatly decreased or the species eradicated from sprayed areas.

Page 13. G. ECONOMIC ANALYSIS

Again only cattleman profits are considered. Excluded are the over 8 million people who utilize public lands in other capacities. Cattlemen are in the minority use of public land. Why should only their economic value be considered? This is not democratic use of public land.

How long does it take to pay for the $5.00 per acre project costs on the basis of current grazing fees?

Page 15. 2. Project Economic Returns. The report indicates spraying increases grass production for only a 20-year period. Then, because of poor management, spraying will again be necessary.

How can $3.93 be used for calculating costs? This is not the cost of an AUM to the cattleman on public range.

Page 15. 4. Other Benefits Not Calculated.

The use of sprayed areas by wildlife is greatly reduced (Trost and Olsen, 1971 and 1972), yet this is considered in the USDA impact statement as a plus factor.

Hunters rarely hunt in sprayed and reseeded areas for sage grouse, doves, or sharptails. Instead, native sage areas are hunted for these species.

Page 16. 5. Alternative Cost Comparisons.

a. Prescribed burning. Two dollars is added to the cost for burning. The Forest Service does not receive $2.00 per acre for forage. At $.34 or less than $1.00 per AUM, $.10 or $.34 would be a much more realistic figure per acre for forage value. Thus prescribed burning would be less espensive than spraying.

No consideration was given to the fact that burning does not decrease the density of forbs as does spraying. Animals can and do move out of an area that is being burned. They cannot move out of an area being sprayed because there are no attempts made to warn them.

b. Chaining. While the most expensive, chaining is probably also the best method, in my opinion Examination of fields that were chained in Curlew Valley showed no decrease in species density or diversity. Production was high per square meter. Predatory birds hunted the area, indicating the presence of prey species. Bitterbrush, a valuable big game forage plant, sprouted and prospered. Organic matter and nitrate were not lost as they are in burning, but were added to the soil.

Again, forage increase includes only cattle forage and not forage for wild animals. No added benefit was included for increase of wild animals.

Page 17. c. Plowing and seeding. Because of the cost of plowing, and because it is known to wipe out most native plants, I need not comment further on this method.

Page 22. A. AIR

Again see enclosed warning, page 4, "Aerial spray should not be used near crops." According to the Forest Service, rangeland should be considered a crop with value. Thus, to follow this logic, aerial spraying should not be used at all on rangeland to avoid disturbing nearby plants.

Page 22. B. SOIL

Forest litter is used as an example. What about sagebrush soil? Where are soil organisms to live during the 13-28 days involved before 2,4-D breaks down? Again, organisms do not seem to have any value unless they are cattle.

Page 22. C. VEGETATION

"The greatest impact results from injuring or killing some plants susceptible to 2,4-D." According to Stauffer Chemical Company (p. 4) all broad-leaved plants whether dormant or during growth stages are damaged or killed by 2,4-D even in minute quantities. Evidence that species diversity and density are reduced is found in sprayed areas of the Pahsimeroi Valley, Curlew Valley, Dry Creek Drainage, Idaho, and in Harney and Malheur Counties, Oregon, and in Curlew Valley, Utah.

3. Forbs. The study quoted is, in my opinion, a biased one with intent to prove that 2,4-D does little or no damage to species diversity. Why was only this one study quoted in trying to justify the use of spray? Why were only pounds of forbs measured and not densities and diversity quoted? Why were not studies quoted showing wild animal decrease in sprayed areas?

Although this quoted study shows no or light harm to the species in the following list, in the areas mentioned earlier in my statement these species are rare or wiped out in sprayed areas while present in large numbers in adjacent unsprayed areas.

Ceanothus velutinus
Populus tremuloides (2,4-D is commonly used to eradicate this species)
Potentilla fruticosa
Prunus virginiana
Purshia tridentata
Salix species (Willows are commonly eradicated by 2,4-D application. E.g., willows were killed on the Stone Reservoir Dam in Curlew Valley by spray.)
Symphoricarpos oreophilus
Tetradymia canescens
Achillea millefolium
Agastache urticifolia
Antennaria species
Astragalus convollarius
Astragalus species
Commandra umbellata
Crepis acuminata
Delphinium departatum and glaucescens
Erigeron species
Eriogonum heracleoides
Eriogonum ovalifolium
Geranium viscosissimum
Linum lewisii
Lithospermum ruderale
Lupinus sp.
Penstemon sp.
Perideridia gairdneri
Phlox sp.
Rumex sp.
Senecio sp.
Solidago sp.
Viola spp.

The reason for the sp. designation in some of the genera rather than the actual species name is that the species in the areas I mentioned differ. Nonetheless, they were greatly diminished or wiped out by spray, not unharmed or lightly affected, as this USDA study indicates.

It is my opinion that this impact statement is meant not to inform, but rather to cover up the real truth of the damage that spray does to the vegetation diversity, density and to the density of wild animal populations. This portion of the report is good evidence of this attempt.

Page 24. D. WATER

Again one study was reported. No mention was made of transport of 2,4-D by rain or in soil groundwater. The ppm herbicide content of water samples quoted does not take into account potential magnification by organisms through the food chain. Herbicides apparently cause an increase in birth defects in Viet Nam. Their use there has been decreased, yet we want to use it on our public lands (Science, 8 Jan. 71), (Science, 26 June 70).

Page 25. E. ESTHETICS

"After a number of years (5 to 10) the dead brush is usually broken down and the remaining live sagebrush and new sagebrush tends to neutralize the contrast with untreated areas." Again look at Funk Field in Curlew Valley which has not been sprayed for 25 years. "If the dead sagebrush stalks are objectionable, they can be eliminated by dragging a roller or an anchor chain over the area." Chaining was regarded as too expensive on a previous page, yet here chaining and spray are both regarded as good. Is this an attempt to again delude the public?

Page 25-26. H.. ANIMALS, BIRDS, AND INSECTS

"Furthermore, treated areas are not grazed by livestock the season of treatment." The cost of this loss was calculated for burning, for plowing, and for chaining, but not for spraying to give a better cost ratio for spraying and an adverse one for chaining, plowing, or burning. Why are cattle kept out during the season of treatment if 2,4-D is not harmful? Again, what about wildlife? Wildlife is dependent upon an area for its food 12 months of the year.

Page 29. C. VEGETATION

3. A wider diversity of plant species. . . . Again fabrication. Species density and species diversity per square meter are decreased, not increased, as this statement states. A less diversified habitat results from fewer plant species; thus fewer animals can live in the area twelve months of the year.

Page 30. G. ANIMALS

Again livestock are listed first and foremost, even though fewer taxpayers use Forest Service land through cattle. See Appendix . Elk,

antelope, mule deer, rodents, and sage grouse in study after study are reduced in number after spraying of range, not increased, as this information implies. Ask any hunter where he hunts these animals. Few if any will say in a pure stand of crested wheat.

Page 42. H. TAKE NO ACTION

"This is not a viable alternative. . . ." From whose point of view? No action would be far more preferable than further destructive action such as spraying. The Forest Service has allowed the land to deteriorate; they should not cause further deterioration by spraying.

Page 46. "This program will cause no known irreversible or irretrievable commitment of resources." This is in error. It is known that species have not yet recovered in the area of Howe, Idaho, after 25 years. How long is no known irreversible commitment?

OTHER COMMENTS

The local populace attributes great national significance to the number of cattle and sheep which graze on public land and regard grass or browse not consumed by livestock as wasted. The philosophy of private owners toward public land too often tends to be one of "getting while the getting is good" and not worrying about what happens to the land. The repeated cycle of spray-seed-overgraze-spray-seed-overgraze indicates that too many land managers and livestock owners do not appreciate the net effects on the land itself or the vegetation it supports. Further, it is not an economical operation when environmental aspects are also considered.

We must question whether it is economically sound to destroy vegetation and top soil for a small return of protoplasm in the form of beef for the table. On a national scale, we find that livestock production on public lands is a very small percentage of the total production (Appendix Tables 1 & 3). Examination of these tables reveals that the amount of beef produced on federal land is at most 4.75% of the nation's total beef production. It must be noted that Department of Agriculture figures do not differentiate between cattle, horses, and swine when referring to grazing permits and the totals include these animals as well. Slaughter data are for cattle only. Thus the true percentage of cattle on public lands is actually less than 4.75%. We must question whether it is worth jeopardizing vast areas of our country for at most 4.75% of the nation's beef production and 36.56% of its mutton production.

There are several reasons that grazing of domestic livestock is considered more harmful to a watershed than grazing of wild game. Domestic livestock generally move in large numbers during the grazing season, while at that time game moves in pairs or small bands. Large concentrated numbers graze less selectively and more extensively. Few organisms select, nibble, and walk on. The repeated trampling by large herds crushes small plants and lichens, leaving the soil exposed to wind and runoff erosion. With fewer animals, the plant cover has a chance to heal between tramplings.

Cows tend to graze near springs and streams, causing siltation and damage to stream bottoms in addition to reducing water holding capacity. Wild game tends to stay away from such areas except in winter and when they obtain water.

Because of herd trampling and overgrazing, some areas lose their productivity and their ability to retain water during thaws and after precipitation; thus the danger of flooding increases. Plant diversity is lessened and weed plants such as large sage, cheat grass, mule's ear, rabbit brush, and canadian thistle enter and make the range less desirable for domestic as well as game animals, to say nothing of the people who could find recreation in the area. These areas are then regarded as requiring chemical treatment. Public officials I have interviewed seemed unaware that by spraying they were very effectively reducing plant diversity from 60-70 species in an untreated area to approximately four species in heavily sprayed areas or to 15 species in less heavily sprayed areas. Because the plants were unknown to them, they were regarded as unimportant! Such ignorance and apathy on the part of public officials must be corrected. Large stands of Wyethia (Mule's Ears) testify to past overgrazing and abuse. Areas already abused by overgrazing are thus further abused by spraying. The "correction" is actually further destruction.

Deterioration of range has accompanied profit to a select few in the region. This has occurred over an extended period of time. Correction of this condition should not be expected to be inexpensive or fast. A cheap application of spray may enhance conditions for livestock for a few years, but it will not provide an area which can be useful to the majority of society. Yet spraying is continuing as a correction for reducing "weeds." A means must be found which will remove only the weeds, allow the top soil to remain, and which will foster the return, not the demise, of species diversity. Chaining where suitable is one possible method.

If we compare the number of user or visitor days or visits to public lands (Appendix Table 2, page 12), we find that on BLM land cattle and sheep operators are outnumbered by every other category of use. Because many who have been classified under the Taylor Grazing Act would also have grazing permits, the total number of operators was actually less than 23,132. Visitor days to BLM lands for recreation use numbered 38,804,000. Even if each person who visited spent 30 days on BLM land, which is highly unlikely, the number would be 1,293,466 visitors. This greatly exceeds the cattle and sheep operators of less than 23,132 U.S. total.

These remarks should not be construed to mean that grazing on public domain should be eliminated. It should, however, be closely scrutinized. Where present practices appear to promote growth of undesirable plant species, grazing rates should be adjusted to prevent such changes. Where cattle or sheep are eliminating browse plants for game, any decisions should consider that game hunters far outnumber livestock owners utilizing public lands. Repeated studies have revealed that plant diversity is necessary for wild animal populations to survive in an area. Domestic stock are dependent upon artificial feeding and shelter for survival during adverse seasons.

CONCLUSIONS

1. No more spraying should be allowed on public lands.

2. If any spraying is to be allowed, it should be restricted to only those areas which have been either previously plowed or sprayed, because only in such conditions will spraying not reduce species diversity.

3. For each area that is to be treated for increase of forage, an environmental impact statement should be made which considers all aspects and all benefits, and not just those of the cattle industry.

4. Each area, as shown in the attached information from the Oregon Weed Control Handbook (March 1972, Extension Service, Oregon State Univ., Corvallis), may differ greatly in the way that 2,4-D is broken down. 2,4-D breakdown is slower in dry, cold, and infertile areas. Most of southeast Idaho falls into all three of these categories.

5. The term "multiple use" should not be used to disguise what is actually benefit for only a small segment of America's population.

6. Chaining should be used to correct those situations which environmental impact statements show need correcting.

7. Environmental impact statements on public lands should not be drawn up only by people who favor the cattle industry.

8. Under no circumstances should blanket permission be granted for any kind of environmental alteration, especially spraying. Separate environmental impact statements are needed for each and every area under consideration.

Earl E. Holte

Idaho Environmental Council

P. O. Box 3371 - University Station
Moscow, Idaho 83843

December 11, 1972

Mr. Vern Hamre, Regional Forester
Intermountain Region
324 25 th Street
Ogden, Utah 84401

Dear Mr. Hamre

We are pleased to comment on the draft environmental impact statement titled, "Herbicide Control of Sagebrush and Wyethia in Idaho."

In general we feel that (1) the statement is too brief, (2) it is inaccurate in places, and (3) it is biased in favor of the proposal. We also think that the proposal should not be undertaken until more knowledge of the various effect of herbicide on rangeland eco-systems is known. Furthermore, we feel that a separate environmental impact statement should be issued for each program area, a single general statement for all of southern Idaho is not valid.

Specific Criticisms-

In the statement of "Purpose" (p.4), "...plants such as sagebrush and wyethia increased to near pure stands [due to overgrazing]. Plant communities dominated by one species are more subject to catastrophic occurances. A complex mixture of species provides buffers against the impacts of disease, insects, grazing, fire, drought, and other natural or unnatural impacts."

First of all, as far as we know no pure stands of sagebrush or wyethia exist in Idaho. Of course, on millions of acres sagebrush is dominant, but in almost all cases the total number of species represented is good. Examination of sprayed areas in the Curlew National Grasslands shows that the species diversity on the sprayed areas is much less then on the sagebrush dominant areas, with some sagebrush areas showing as many as 90 species represented and some sprayed areas as few as four.

If the Curlew area is an exceptional case, you might explain why in the final impact statement. This is an important point because the whole thrust of your draft statement is that species diversity will be improved and orginal range conditions approximated. We question this.

In section G, "Economic Analysis," you conclude that the cost/benefit ratio for the program is 3.23 to 1,00. We feel that this is in error. Benefits were calculated on the basis of $3.93 for each A.U.M. increase after treatment. The $3.93 is the commercial fair market value, which is higher than the actual grazing fee paid. Use of fair commercial market value might be justified if market interest rates are used to discount the value of a dollar after twenty years. However, the discount rate used in the calculation was 7.5 %, lower than equivalent market interest rates. The effect of this error is to overestimate benefits. Furthermore, because we feel that the effects of spraying are essential unknown and so an additional 5 % charge should be added to the discount rate to account for uncertainty.

On page 15, the impact statement lists "other benefits not calculated." The upshot of this is that the true benefits are greater than the calculated benefits because of a positive, but undetermined, effect on wildlife habitat. Many biologists at Idaho State University are of the opinion that the effect on wildlife habitat will be negative instead. In other words, you need to provide evidence that these "other benefits" are not really costs.

Experience at various sprayed sites in southern Idaho indicates that Table 1, taken from the article by Blaisdell and Mueggler, "Mortality of Plants on Areas Sprayed with 2,4-D to Control Big Sagebrush," is in error. Many species listed as "unharmed or lightly-harmed" have registered complete mortality. It could be the southern Idaho sites differ from those investigated in the article. Of course, this is provides evidence that a series of impact statements is needed to support the contention that herbicide use is required.

On page 22, it is indicated that the residence time for 2,4-D in the soil is, at the most, four weeks. This is true only under ideal conditions. Residence time can be lengthened a great deal by dry conditions, cold, or lack of fertile soil. All of these unfavorable conditions are widespread in the mountainous rangeland targeted for herbicide treatment. We must conclude that wildlife may be exposed to the toxic effects of the spray for an entire season.

The conclusion of the impact statement that indicates that the alternative of taking no action is unacceptable in the eyes of the Forest Service is not correct if our contention that species diversity is reduced is correct. In that case, the alternative of no action may serve sustained-yield better than treatment, unless, of course, we assume only livestock enter into considerations of sustained-yield.

A few minor points need to be cleared-up for the final impact statement. What time of the year will spraying occur? Will aesthetic values be protected? Will spraying occur in candidate wilderness study areas? Will spraying take place in any of the inventoried undeveloped areas? If so, will this eliminate them from future consideration for wilderness? Under the terms of the settlement with the Sierra Club over the suit about the undeveloped areas, the Forest Service agreed to write an environmental impact statement before developing any of these areas.

For how long will soil in sprayed areas be subject to erosion? What will be planted (or will anything) in the sprayed areas? Crested wheat grass, of course, is poor wildlife habitat.

Finally no consideration was made of simply taking livestock off the range to let it recover naturally. Perhaps a cost/benefit ratio of increased hunterdays would offset that loss of grazing. We don't say it will necessarily. It's just a possibility that could be investigated.

Thank you for your concern. We hope our comment are helpful. Please send me a copy of the final impact statement.

Sincerely,

Ralph Maughan

Ralph Maughan, Southeast Idaho Wise Use

December 11, 1972
225 N. Lincoln Ave.
Pocatello, Idaho 83201

Mr. Verne Hamre
Regional Forester
Federal Building
324 25th St.
Ogden, Utah 84401

Dear Mr. Hamre:

I am writing in response to the proposed spraying of 15,000 acres by the Forest Service and trust that as long as my letter is dated the 11th it will be entered into the record. If not, please let me know. I represent 46 members of the Pocatello Audubon Society and have been authorized to speak for them. I feel that much of your environmental impact statement was highly biased in favor of continued service to the grazing interest and wish to address this point.

One of my concerns is that the land in question has too much Wyethia and Sage Brush on it. To me this statement means that you have already allowed the land to be overgrazed! Now you are going to "rejuvinate" it - only to put more cattle on the land the next year! If you were going to put the same number or preferably even less on the land you may preserve it, but your policy makes no sense to me. The land will only go back to sage again in twenty or so years. I resent your spending about $87,000 of public money to help a few cattle and sheep owners.

The sample map in your report was inadequate, but it looked as if most of the spraying would be done in meadows or valley floors. This is near water, when present, and this is where many animals concentrate. It seems you will be modifying the entire food web in the habitat you spray, yet your report makes light of this possibility. The report predicts no change in "mice" but a decrease of the vole population. How will this reduced food supply affect hawks, owls, and fur-bearing predators? Your statement that spraying will increase the plant species diversity and thus the community stability is simply not true as long as heavy grazing is allowed! I have censused many sprayed and unsprayed areas near the Curlew Valley of southern Idaho and have observed fewer plants, fewer mammals (except for cows), and fewer and different bird populations than in the unsprayed areas (See IBP desert biome report on bird validation, Logan, Utah, 1972). Your Brewer's Sparrow densities are more like populations on overgrazed land - I found at least twice as many sparrows in unsprayed sage in 1971 and 72. Also your report does not mention Sage Sparrows, Lark Sparrows, Gray Flycatchers, and especially Mourning Doves - all of which are abundant nesting birds in many sage areas. I found the doves were one of the first nesting birds to leave after spraying. Lark Buntings are very rare in much of Idaho, and if present as your report says, care should be taken to preserve their populations. About the only animals your report put much value on was game animals, so I'll comment on Sage Grouse. Young Sage Grouse can be helped

by more abundant forbs, as your report implied. However, as you indicated on page 8 the critical and thus limiting time for them is winter when they need sage leaves to live, not spring and summer. Thus you will probably eliminate this valuable native game species with your treatment, to say nothing of the Sharp-tailed Grouse. Consequently I think I can fairly say that your bird observations and concern are both superficial and perhaps crass.

I would urge your agency to conduct more research into the effects of spraying and other habitat management on bird populations. I think it is time to question the desirability of raping our public land in order for a few to make more money. Many of us enjoy hiking and camping in these forests also - the cow feces, noise, destruction, and horse flies don't add much to the natural beauty.

Sincerely,

Charles H. Trost

Charles H. Trost, PhD.
President, Pocatello
Audubon Society

CITIZENS ENVIRONMENTAL COUNCIL

P. O. Box 4525
Pocatello, Idaho 83201

Working For Survival

December 6, 1972

District Forest Ranger
Federal Building
Pocatello, Idaho 83201

Dear Sir:

We, of the Citizens' Environmental Council, are extremely concerned about your proposal to begin spraying national forest lands in order to eliminate sagebrush.

We oppose this on several grounds:

1. Unless absolutely necessary, we are opposed to spraying because of the release of poisons into the eco-system and because of the damage to wildlife.

2. We feel that the reason that this spraying is being proposed is simply to appease the livestock industry. And hence, to the extent that the national forest lands are damaged by spraying, the multiple use concept of the use of national forest lands is being violated. In particular, we are much more interested in having national forest lands provide habitat for wildlife than forage for sheep and cattle.

3. We would like to point out that if it can be demonstrated that it is necessary to remove sagebrush, that "chaining" is very effective in removing sagebrush and does not simultaneously kill off the vast number of small animals, birds, and other plants that spraying does.

4. The fact that it is proposed that "only 5%" of the land is to be sprayed each year, in our opinion, shows a gross lack of knowledge concerning the effect of spraying on wildlife and other plants. Our information is that for a period of much longer than twenty years (spraying 5% of the land each year could mean it would all be sprayed each twenty years) the diversity of wildlife and plant species in sprayed areas is much less than half of what it was before spraying.

5. Finally, we would like to point out the obvious fact, since people in the Forest Service seem unaware of it, that there are many people in this country who don't make their livelihood by ranching or lumbering. We feel that it is high time that we be given some consideration in the way in which OUR national forest lands are administered.

Very truly yours,

Stanley H. Vegors

Stanley H. Vegors, Jr.
Chairman

jsh

cc: Secretary Rogers C. B. Morton
Department of the Interior
Washington, D. C.

Supervisor, Caribou National Forest
427 North 6th Avenue
Pocatello, Idaho 83201

Mr. William Ruckelshaus, Administrator
Office of Public Affairs
Environmental Protection Agency
Washington, D. C. 20460

Mark R. Collie
1920 E. Columbia St.
Allentown, Pa. 18103
Mark R. Collie
Idaho State University

Vern Hamre
Regional Forester
Forest Service
Federal Office Bld.
324 25th St.
Ogden, Utah 84401

Mr. Hamre,

I am sending this letter in my official position as an irate member of a society that calls itself the citizenry of these United States. I, for one, am very alarmed, outraged and amazed at the fact that the U.S. Government is considering the herbicidal spraying of sagebrush and wyethia on public lands in southeastern Idaho. That's right - the land that ALL of us own and have a right to protect and preserve as it is now - in its natural state of being.

As I read the proposals set forth, the U.S. Government, through the Forest Service will be using 2-4D as an herbicide to control sagebrush and wyethia on Nat'l Forest and Nat'l Grasslands of Idaho at the rate of 5% of land per year for a period of 20 years. In other words, 100% all of the Nat'l Forests and Grasslands in southeastern Idaho would be eradicated of 2 species of plants to serve what purpose? Just because these 2 abundant plants are not consumed by the cattle - that does not justify the elimination of every other life form living within the confines of southeastern Idaho. And I mean every other life form - except cattle, one species of bird (Horned Lark-Eremophila alpestris), and man (the sheepherder and cattle rancher).

Gone would be nearly all of the species diversity among the plants and animals that make southeastern Idaho what it is - a land of great diversity. Go ahead and spray with 2-4D if you dare to - man will not stay. Why? Here is a partial list of reasons:

1. the esthetic beauty of the West will be gone - isn't that one major reason why people come to live here in Idaho, the land where almost everything is plentiful? There is no great amount of monetary value out here; not when you compare it to the recreational value of our public lands.

2. Mule Deer and Sage Grouse would very quickly disappear along with all other game and non-game species. They will disappear because they cannot exist on Crested Wheatgrass (Agrophyron cristatum) which will be the replacement for all the other plants that will have been killed off by the spray. This would be man's implantation on his neighbor's land for many years to come; probably 80 to 100 years before the other plants restore themselves to their former numbers in their natural environment (if it exists).

3. With only cattle roaming the forests and "grasslands" the land will lose its recreational value and isn't this the reason that the National Forests and other National lands are set aside - for the majority of people to enjoy and benefit from their existance and from their by-products. And don't tell me that the cattlemen are in the majority. The general populace is in the majority.

4. The populace of southeastern Idaho may move out of the state, or at least this corner of it because their reasons for staying would be challenged. If they want to live in a grassland area and raise cattle it would be a lot easier and less expensive to move to the prairie states. There - the family incomes would no doubt be higher than in Idaho.

5. Idaho would lose much of its recreational value in the eyes of the people of the rest of the 49 states. So, Idaho still hasn't been visited by many out-of-staters yet? And some say too many have already come in and settled down, breaking up the peace and tranquility of the wilderness and semi-wilderness areas?

Think back on a quote by Henry David Thoreau, " In wildness there is preservation". This statement holds true only if we think ahead to the future. For it may be our preservation-the preservation of mankind that Thoreau refers to. Are we worthy enough to be held in high esteem and be the fortunate ones to survive on Earth. I think not, because mankind is dependent upon all of his environment and upon all of his fellow inhabitants. The elimination of any integral part of this ecosystem leaves the impression on me that man does not think highly of his survival.

To prevent this catastrophic series of events from occurring and still accomplish the deed of eradicating the sagebrush and wyethia, I suggest 2 proven and less expensive (monetarily and ecologically speaking) methods, whereas species diversity would not be reduced to 5% !! These methods are:

1. chaining - where an archor chain from an old WW 11 ship is interlaced with short pieces of railroad ties is hooked between 2 caterpillar tractors and dragged through the sagebrush. This action removes the sagebrush enough that the Crested Wheatgrass can be planted. This also allows for all the other plants to grow and reproduce because the removal of sagebrush is a form of cultivation where the soil is turned and the minerals and soil nutrients are replenished.

2. controlled burning - under supervision of biologists so that the native inhabitants are not disturbed during the nesting season or if the area is used as a migration rest stop where large numbers of birds or endangerd species come to feed.

Sincerely, Mark R. Collie

NOV 15, 1972

Dear Mr Hamre,

After reading the article in the paper it is important that I write in opposi to the use of 24D. I can't see that the economic values are important to the out come, but because the cattlemens associatio has a large representation, careful consideratio should be given to this proposal. The ef of 24D on foliage and wildlife are too lon range and too broad to warrant its use to eliminate sage brush, especially when other means are available. Officially I would like to go on record as opposed to the use of 24D.

Dan McBride

STUDENT UNION
IDAHO STATE UNIVERSITY
Pocatello, Idaho
83201

Dan McBride
834 N 8th
Pocatello, Idaho
83201

Idaho State Un
Pocatello, Idaho
November 1972

Mr. Vern Hamre
Regional Forester
Forest Service
Federal Office Building
324 25th Street
Ogden, Utah
84401

Sir;

I was extremely pleased to note that you are soliciting opinions concerning the use of 2,4-d on public lands. My opinion of this horrid chemical has long been formed.

In writing this letter, I am acting in behalf of the entire Wilderness Club of Idaho State University, of which I am the newly elected president. Our goal as a club is to both experience the virgin wilderness, and to preserve the wilderness for our issue and their issue.

I am unequivically opposed to the use of any chemical whatsoever on any public lands at all. Especially 2,4-d. There is no justification of any sort for the use of these chemicals.

If 2,4-d were,as is proposed used on five percent of the range land each year, at the end of twenty years, all of the land concerned may possibly be sprayed. Since it has been demonstrated that 2,4-d, when used, totally eliminates wildlife except for one variation of the meadow lark, this would mean that for the next eighty to one-hundred years;which is the effective lifespan of the chemical; our rangeland would be devoid of the natural animal life.

Considering that the rangeland concerned produces but two and one-half percent of the beef cattle in the U.S., we feel

that the detrimental effects of these policies would far outweigh the questionable benefits.

I hope that this letter has proven helpful.

Sincerely yours,

David M. Arcano

David M. Arcano, Pres.
L B U Wilderness Club

To; Vern Hamre
Regional Forester
Federal Building
324 25 th Street
Ogden, Utan 84401

Official Mail
Roger A Ol
Idaho State University
Department of Biology
POCATELLO, IDAHO 83201

CONCERNING CHEMICAL CONTROL OF SAGEBRUSH

I have done some research through Idaho State University concerning bird populations on sagebrush and stands of crested wheat grass in Curlew Valley, Idaho. Four plots, each consisting of 250 acres, were censused during the summers of 1971 and 1972. Two plots were native sagebrush , a third was a stand of crested wheat grass, and the fourth was a mixture of sage and crested wheat grass.

Preliminary evaluation of field data shows a marked differention of habitat useage by small birds. The two native sagebrush plots provide cover and nesting sites for five species of birds, ie., Sage Thrashers, Sage Sparrows, Brewer's Sparrows, Mourning Doves and Western Meadowlarks. The Brewer's Sparrow made up the bulk of the breeding population with nesting densities as high as one pair/2.5 acres. This value is twice as large as that reported from the one paper cited in the environmental impact statement.

The mixed grassland-sagebrush plot provided nesting cover for Brewer's Sparrow, Sage Thrasher, and Meadowlarks, but the densities of these birds were considerably less. Brewer's Sparrow and Sage Thrasher densities were almost half that of the adjacent native sagebrush plot. In 1972 this plot was not grazed during the summer and resulted in a dramatic increase in the population of Brewer's Sparrow. A few Horned Larks and Vesper Sparrows used this plot, but nesting doves and Sage Sparrows were not present.

Finally, the plot with only crested wheat grass supported a sizeable number of Horned Larks, but this was the only species that utilized this area. On this plot the monotypic flora resulted in a monotypic avifauna.

The proposed spraying program does not include re-seeding, but the result of habitat change by spraying might be analagous to the study briefly described above, since grasses would be the dominant vegetation.

If land conversion is necessary, a more desireable method might be chaining. With this method, low sage would remain. This would provide birds with nest sites, as all above ground nests are built in low sage less than 24 inches from the ground. It would also promote new growth from native plant species while reducing competition from sagebrush. Chaining done after July would not interfere with nesting birds, even though population densities would be lower in following years due to a reduction in nesting sites and perhaps foraging habitat.

We must think in terms of a total plant and animal community to prevent exploitation of any part of the ecosystem. Small birds and mammals play as important a part in the food chains as cattle, big game and sage grouse, even though an economic value cannot be assigned to them. If the Benefit:Cost Ratio is 3.23, then surely a more expensive method of land conversion, namely chaining, should be considered.

Roger A Olson

Copy*

Dear Sir:

Please! No more herbicide 2,4-D! Surely, even the limited mentality of our government agencies should be able to realize this isn't the answer. The sagebrush got there through man's abuse of the land — what purpose will be served by further abuse of the same land??!

/S/ Flora J. Folmshee

Copy*

960 Wayne Avenue
Pocatello, Idaho 83201
11 December, 1972

Dear Mr. Hamre:

We want to let you know that we are very much opposed to the spraying of sagebrush on 15,000 acres of Forest Service lands as has been outlined in the Pocatello Audubon Society Newsletter for December, 1972.

Sincerely,

/S/ Mr. & Mrs. Glen R. Downing

Copy*

Dear Sirs:

I am opposed to spraying to kill sagebrush because of the damage it does to the other plant life in the area. We enjoy looking at wild flowers in the area and spraying would greatly reduce the vegetation.

Spraying also keeps birds out of the area and we don't want that.

Sincerely,

/S/ Mr. & Mrs. Kent Durst
Pocatello, Idaho 83201
42 Rosewood

*Retyped for legibility - Original copy on file

Copy*

Dear Sir:

I am opposed to using 2,4-D on public lands.

/S/ Robert E. Dixon

Copy*

November 16, 1972

Dear Hamre,

I am opposed to the usage of 2,4-D on public land. Please stop it!

/S/ Carol Foley
#502 - Turner Hall
Idaho State University
Pocatello, Idaho 83201

Office of Outdoor Program
Student Union - I.S.U.
Idaho State University
Pocatello, Idaho 83201

*Retyped for legibility - original copy on file

Dec. 8

Idaho State University

Dear Sir,

I am writing to express my opposition to the blanket spraying of sagebrush and weeds.

I believe chaining the sagebrush or burning would be a better solution to this problem.

Sincerely,

Jean Henderson

Jean Henderson
1431 ½ South 7th
Pocatello, Idaho 83201

December 11, 1972

Vern Hamre
Regional Forester
U.S. Forest Service
Federal Office Building
324 25th Street
Ogden, Utah 84401

Dear Sir:

I am writing this letter in regard to 2-4D - Herbicidal spraying of 5% of the land for 30 years. I am opposed to this measure because I strongly believe we need the native plant diversity.

I offer my objection to your plan.

Sincerely,
Martha Benson
513 Harrison
Pocatello, Idaho

Dec. 9, 1972

Vern Hamre
U.S. Forest Service

Julia Haviland
Box 445, 154
Pocatello, Idaho, 83201

Dear Sir:

I am strongly opposed to the proposal for blanket permission to spray land with 2-4 D. Such a method might seem to be cheapest now, but will in the long run prove to be terribly expensive. Other methods to remove sagebrush, such as chaining or burning are far better and do not cause such long range disturbance of an area.

I am opposed because of the long range effects to an area after spraying, effects not necessarily observed in my lifetime. Some of these effects are the loss of bird life completely and/or as nesting sites, the reduction of true species diversity, and effects to the whole of an area which we are not aware of until after the spraying.

Sincerely yours,
Julia Haviland

221 S. 12th.
Pocatello, Idaho
83201
Dec. 11, 1972

Vern Hamre, Regional Forester
Federal Bldg.
324th 25th. St.
Ogden, Utah 84401

Dear Sir:

We are concerned about the proposed herbicide control of sagebrush and mule's ear in Caribou National Forest and in other forests and grasslands in southern Idaho.

We visit Caribou extensively during the year to appreciate the variety of the flora growing there. Any spraying in the area would destroy many types of vegetation -- many more than just sagebrush and wyethia.

In our experience, the areas evidencing the most inbalance in amount of wyethia are those areas in which grazing is practiced. The cows both eat and trample other vegetation and the mule's ear flourishes. Cessation of grazing would eliminate the cause of the problem. We would support any effort to prohibit the livestock owned by a few citizens from adversely affecting the National Forests owned and enjoyed by so many other citizens.

We appreciate your request for public reaction to the proposed spraying.

Sincerely yours,
William Byers
Judith Byers
William Byers
Judith Byers

To Whom it may Concern

Dear person,

To state my opinion to your proposed twenty year sagebrush eradacation program, which will affect the southeastern Idaho area, simply and directly:
It Sucks!

While working for the I.S.U. archeology department doing site survey work in the Saylor Creek area, located in Elmore and Owyhee counties, I observed effects of sagebrush eradacation.

Sagebrush eradacation is a somewhat euphemistic term for areas that have been eradacated.

A great absence of life energies is present in areas that not only have been distroyed of sagebrush, but also of much other flora, (a few types of grasses, mayfe three, and a great abundance of Canadian Thistle), fauna (rabbit and coyote signs are occasional and just passing thru, the game fowl stays in the sagebrush), and spirit (it was a drag to be in).

I have also heard that you intend to use either one or both of defoliant poisons known as 2,4 D and 2,4,5 T (Orange Agent, types used in Viet Nam with curiously dangerous effects upon Man - kind.

If you do intend to use poisons of this type, in my own self-intrest and the my intrest in those I love, I wish that you would take your defoliant chemicals, all of them, and 10 pounds of salt and shove both of these up your ass(es).

Sincerely,

Bill Brooks

420 Crestline Drive
Boise, Idaho
December 8, 1972

Vern Hamre
Regional Forester
Federal Building
324 25th Street
Ogden, Utah

Dear Mr. Hamre:

Please accept these comments regarding "USDA Environmental Statement on Control of Sagebrush and Wyethia in Idaho" by the writer Ernest E. Day, 420 Crestline Drive, Boise, Idaho.

This writer believes that if there is to be any spraying for sagebrush in Idaho that an environmental statement should be made prior to application in each individual area involved. General authority to spray such vast areas should not be given on the basis of one blanket approval. Each area and its specific problems should be considered on its own merits rather than such a "shot gun" approach for 15,000 acres.

Since this land belongs to the public, its best interest must be the criteria -- not the best interests of a single user group. Complete safety of a project plus its desirability must be conclusively proved. In my opinion this is not done in the subject environmental statement. Total impact on the environment must be considered and the conclusions drawn from this report do not appear to be based upon sufficient evidence to prove the case for spraying with 2,4-D.

This, coupled with the superficial treatment of alternative practices or controls as enunciated in the report, leave a great question as to the desirability of such proceedures.

Wildlife values to deer, antelope and sage grouse can not but be affected adversely by such general or widespread spraying. Fish need stream-side cover for shade. Antelope fawning areas need large sagebrush for shade. Deer, particularly in severe winters depend upon sage for perhaps a majority of their diet. Sage grouse are dependent upon it for nesting and for cover.

The cost to benefit economics are speciously based on an AUM being sold to the grazer at market value. After eight years as a wildlife representative on a District Advisory Board, I know that the government subsidizes the livestock operators with grazing charges far below market value. This practice, I understand, is somewhat the policy of the Forst Service also. In fact, if the true economic marginality of the proposal were illustrated in this report, the non economic factors detrimental to the public interest would far out weigh the economics of the proposal.

Esthetics, while not being the main consideration, should be given some weight in balancing the desirability of the project

Baren slopes are uniyiting. Even the wyethia makes up a beautiful part of the early summer landscape. Photogeniety of entire vistas is destroyed or down graded by 2,4-D spraying.

In conclusion: "The greatest good for the greatest number in the long run" is not proved by this Environmental Impact Study on Spray. A moredramactic example of single use as compared to multiple use is difficult to conceive.

I sincerely request that the Draft Environment Statement rejected as not in the public interest since the case for desirability is not made and freedom from dangerous and adverge results is not proved conclusively, despite the flat statement made that "this program will cause no known or irreversible or irretrivable commitment of resources".

Sincerely,

Ernest E. Day

EED/lh
cc: Russell E. Train, Chairman
Council on Environmental Quality Activities

Senator Frank Church

Congressman Orval Hansen

Thomas L. Kimball, Executive Vice-President
National Wildlife Federation

Dec. 15, 1972

Vern Hamre, Forester,
Region 4, U.S.F.S.
324 - 25th St.
Ogden, Utah 84401

EIS - "Herbicide Control o:
Sagebrush and Wyethia in I

Dear Mr. Hamre;

The draft Environmental Impact Statement "Herbicide Control of Sagebrush and Wyeth in Idaho" is too general for the scope of the action described, and also seems to me to represent more of an attempt to justify an existing practice rather than to describe environmental impacts of, and alternatives to, that practice.

I believe that the basic question relating to the purposed of the National Forests needs more consideration. Obviously, determining the optimum "mix" of the various multiple uses of the forest in a given area, such as a watershed, is very difficul but what we see all too frequently is an attempt to maximize one use rather than to optimize the mix. In this case, it is forage production that is to be maximized. Too often, other uses and values suffer when one use is maximized, whethe it be the production of timber, forage, or wildlife habitat.

The statement is made on page 2 that "Controlling sagebrush and wyethia might best be compared with 'weeding a garden'." This bothers me, not so much the comment in itself, as the uneasy feeling that this expressed the attitude of too many of our National Forest managers. A garden is typically a highly altered and manipulated ecosystem; a National Forest is not, or at least should not be. I resent the attitude that the National Forests are gardens, tree farms, or cow pastures.

The point is certainly valid, that past abuses (some of which still continue) such as overgrazing, stream alteration, and lowering of water tables has already drastically altered local plant communities. But I believe that emphasis should be placed more on causes and less on symptoms. Little consideration was given in the draft EIS, for example, to removing stock, or reducing stock numbers, on disrupted land.

The draft EIS argues that 2,4-D can be used to increase the species diversity, and thus to stabilize the plant communities in these disrupted areas. I can't buy this as being generally valid. I have never seen a "pure" stand of sagebrush or wyethia - solid stands, yes, but not pure stands; that is, there always seemed to be several other species present. Furthermore, 2,4-D tends to kill many forbs, and while it might cause an increase in the number of grass species, it is not obvious that the net result would be an increase in species or stability.

The point on page 30 that "Spring flowering plants are more conspicuous when brush is scattered." is not impressive when one considers that several species of flowers would have been eliminated or severly reduced by the application of 2,4-D; for example, vetches, arrowleaf balsamroot, paintbrush, lupines, penstemons, and cinquefoils.

On page 6, the draft EIS says that "Sites critical to the welfare of wildlife are not sprayed." While I accept this statement and commend the Forest Service for their effort to protect critical wildlife habitat, I think that many of the areas which are sprayed are of considerable significence to wildlife, even if not critical Sage grouse are dependent on several species of the forbs which 2,4-D kills. Also, as the EIS points out, the number of Brewer's sparrows (and actually several other species of songbirds, in all liklihood) is reduced by spraying sagebrush.

Under the consideration of the alternative of taking no action, the draft EIS states on page 42 that "This is not a viable alternative, when deteriorated conditions exist and practices that are environmentally sound can be employed to hasten recovery." I would not consider that the widespread use of herbicide 2,4-D has been proven to be environmentally sound. Perhaps it has not been proven to be environmentally unsound, at recommended dosages, but that is hardly the same thing. In actuality, do we really know that much about it and its long range effects yet? I think not.

I am also a little disturbed over the short period of public comment on the draft EIS. I realize that costs prohibited the printing and distribution of a great many copies, but this is all the more reason for providing a longer comment period, so that copies could be more efficiently shared. I understand that the deadline for comment was to have been Dec. 11th. Yet, the draft EIS was only submitted to CEQ on October 27th, and the first news article on the existence of the draft that I am aware of did not appear until November 21st. (Post Register) Since an agency cannot take any relevant administrative action for 90 days after submitting a draft EIS to CEQ, I would assume that you could take public comments for nearly 90 days. I hope that you will continue to take public comments for a few weeks yet on this draft EIS; assuming so, I am passing my copy on to several other individuals who have indicated an interest in it.

My specific recommendations would include the following:

1. More specific EIS's should be prepared, for example, by watershed or by Ranger District. Public comment should be allowed for at least 90 days.

2. The question of how much national forest land should be manipulated to maximize forage production should be presented to the public.

3. Attacking causes of existing problems, for example removing stock from some given areas, should be given more consideration.

4. On those areas where it is determined that sagebrush control is necessary, quit using herbicides, except for highly localized or specialized conditions, until we know a little more of the history of their use after observing already sprayed areas. Give more consideration to fire and chaining.

5. There should be no control in roadless areas. I note that the Salmon National Forest has plans to spray about 2000 acres in roadless areas, and I am opposed to this manipulation of the least disrupted portions of our forests.

Thank you for the opportunity to comment. I would appreciate getting from your office the following information:

1. More history of herbicide use for sagebrush control than was covered in the draft EIS, including:
   a. Acres per year by National Forest in southern Idaho.
   b. A map showing locations of the 15,000 acres per year sprayed over each of the past 5 years.
   c. An indication of where repeated applications have been made, if any.
2. A map showing where future applications are planned.
3. A copy of the final EIS.

Thank you.

Sincerely,

Gerald Jayne

Gerald Jayne
1566 Lola St.
Idaho Falls, Idaho 83401

December 18, 1972
253 - 6th Street
Idaho Falls, Idaho 83401

Vern Hamre, Regional Forester
USDA, Forest Service, Region 4
324 - 25th Street
Ogden, Utah 84401

Dear Mr. Hamre:

Please consider the following comments in regard to the Forest Service Environmental Statement "Herbicide Control of Sagebrush and Wyethia in Idaho".

Comment 1:
Herbicide control and the alternatives considered in Section V just attack the symptons; the dominance of sagebrush and wyethia. The more ecologically sound approach, namely correcting the causes, is not considered. Page 8 states that mulesears wyethia and whitehead wyethia increase due to overgrazing. The obvious solution is to reduce grazing. Several species of sagebrush have become dominant after stream channel cutting and a lowering of the watertable or because of overgrazing. The solution may be to leave the sagebrush as the plant best suited for the dryer soil conditions and as protection against continued overgrazing.

Comment 2:
The environmental statement does not list specific areas which will be sprayed. This list should be included as well as the exact conditions and methods which will be used for each area. Vague statements such as "Basin big sagebrush.....may require additional control treatment in some areas" leave many unanswered questions on the environmental impact. Also sage grouse will be so drastically effected by this spraying that each area sprayed should be specifically discussed. The report says critical game range should not be considered for chemical treatment. Since much critical game range is still allowed to be overgrazed by domestic animals, I find it difficult to believe that these areas will not be sprayed unless all areas to be sprayed are identified in the environmental impact statement.

Comment 3:
In general the report assumes that sagebrush is out of ballance. The sagebrush is dominant however because environmental conditions have changed such that now this is the most suitable plant. The environmental statement should consider that maybe over the long term it would be better to leave the sagebrush alone. It would be unwise to kill all the pine trees in a pine forest to plant decidous trees. The reason the pine trees are there is they are best suited to the particular environment. The same is probably true for the sagebrush.

Comment 4:
Soil stability is not given proper consideration. It would seem that overgrazing and not the sagebrush are responsible for any erosion.

Comment 5:
On page 2, the last paragraph says wyethia amplexicaulis makes us less than 5% of the total acreage treated. Less than 5% hardly seems an imbalance.

Comment 6:
Page 2 states: "Controling sagebrush and wyethia might best be compared with "weeding a garden"." This is ridiculous. Even the State of Idaho, which doesn't consider most of the chlorinated hydrocarbons such as DDT dangerous pesticides, lists 2,4-D as a Restricted Use pesticide which can not be used on gardens.

Comment7:
In section I, the discussion of the economics has nothing to do with the environmental impact.

Thank you for the opportunity to comment.

sincerely,

Dennis J. Peterson

THE LANDHOLDER — IT TAKES ALL THREE — THE SPORTSMAN — GAME DEPARTMENT

SOUTHEASTERN IDAHO

SOUTHEASTERN IDAHO ROD & GUN CLUB
Dale Taylor, President
249 Teal
Pocatello, Idaho 83201

Vern Hamre
Regional Forester
Federal Building
324 25th Street
Ogden, Utah 84401

Dear Mr. Hamre

We of the SouthEasten Idaho Rod and Gun Club would like to go on record as opposing the use of toxicant sprays on public and private lands. Eradicating sagebrush on public lands and planting grasses for livestock owned by private concerns is not in the best interest of the public who also use the same public land for recreation.

Sagebrush may make up 50% of deer food and is imperative for the very existence of sage hens and antelope. A snow fence, sagebrush, holds moisture and offers cover for numerous species of wildlife which do not return to the same area after deadly spraying.

The public land should be used in the best interest of the p u b l i c which is not raising cattle and sheep for a small percentage of ranchers.

Sagebrush in Idaho is the natural vegetation in many areas and without the misuse and management by man, is the cover that should remain.

We hope that all government agencies will work together for the best use of public lands by the majority of people and not bow to the few with money who don't care about ecology and public welfare--just becoming rich at others expense.

In essence--keep public lands as natural as possible--don't destroy our heritage and then take 100s of years trying to coverup our mistakes!!

Sincerely Dale Taylor, President James Henriksen, Secretary

TEACHING/RESEARCH/SERVICE
Forest/Range/Wildlife
Fisheries/Utilization

University of Idaho
College of Forestry,
Wildlife and Range Sciences
Moscow, Idaho 83843

January 26, 1973

Regional Forester
United States Department of Agriculture
Forest Service
324 25th Street
Ogden, Utah 84401

Dear Mr. Hamre:

I am sorry that we did not manage to review your draft environmental statement on practices of herbicide control of sagebrush and wyethia in southern Idaho by your deadline of mid-December. However, I have read through the document since that time and am impressed by its thoroughness and comprehensive handling of the problems involved. I was particularly glad to see the up to date treatment of taxonomic and ecological differences within the species Artemisia tridentata since some of these are likely to be quite important in a herbicidal program. It would appear that your staff has done their homework well in preparing this environmental statement and I would hope that it will be fully accepted by the Council on Environmental Quality and other agencies concerned.

Yours sincerely,

E. W. Tisdale

E. W. Tisdale
Professor Range Management
Associate Director FWR Station

EWT:gb

Two sets of comments were received after the final statement was printed. Therefore, response is included in the Appendix section only.

Mrs. Charles B. Doe's comments were received February 16, 1973. This response is very similar to others received and. if received in time, it would have been included in the Pocatello, Idaho, group.

Comments From the Department of the Interior

This response to the draft statement was received February 16, 1973. For the most part these comments are similar to other comments received and responded to. The final statement contains considerable additional data in response to comments similar to these.

Comments regarding antelope on the Bridger National Forest will be made in the final statement for western Wyoming. These comments are not applicable to Idaho.

The possibility of a sagebrush spray project on the Targhee National Forest, adjacent to Yellowstone Park, is quite remote. Nearly all of the border area is lodgepole pine. The small sagebrush openings that do occur are not being considered for treatment. As for the Sawtooth National Recreation Area, Pioneer Mountains, and the "City of Rocks" areas, we have no proposed spray projects. There have, however, been a number of projects to control sagebrush in past years in or adjacent to the Pioneer Mountains, particularly in the Copper Basin area. Any projects that would be planned, regardless of the nature of the project, would give recreation potentials and other resource values full consideration.

We have included additional data regarding the value of sagebrush in intercepting and trapping snow.

We do not concur with the allegation of inaccuracies. As for omissions, it is impossible to cite every source of literature pertaining to the subject. There are many theoretical impacts that were not discussed. We have thoroughly reviewed a large volume of literature on the subject in addition to in-depth evaluation of all our past projects. We have presented our conclusions based on a preponderance of evidence.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

ER-72/1315

NOV 2 2 1972

Dear Mr. Hamre:

This is in regard to your letter of November 8, 1972, requesting the Department of the Interior's review and comments on a draft environmental statement describing the proposed practice of herbicide control of sagebrush and wyethia in southern Idaho by the Forest Service.

This is to inform you that the Department will have comments on the draft statement but will be unable to reply by the date you requested, since we plan to solicit the views of our bureau staffs at the Washington and regional levels and present you with a coordinated reply. Our comments should be available on or about the end of December 1972.

Sincerely yours,

Bruce Blanchard, Director
Office of Environmental
Project Review

Mr. Vern Hamre
Regional Forester
Forest Service
Department of Agriculture
324 - 25th Street
Ogden, Utah 84401

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In Reply Refer To:
FSF/SQ
(ER-72/1315)

FEB 12 1973

Dear Mr. Hamre:

In response to your letter of November 8, 1972, we have reviewed the draft environmental statement describing the proposed practice of herbicide control of sagebrush and wyethia in southern Idaho by the Forest Service.

Generally, this statement reflects the considerable effort which undoubtedly has gone into its drafting. However, there are several inaccuracies and omissions to which we should like to address some comments.

Page 2, paragraph 2. Comparison of sagebrush and wyethia control to "weeding a garden" is misleading. Some sagebrush species, such as Wyoming Big Sage, are valuable plants for big game, sage grouse, and even domestic sheep during the winter season.

Hydrologic conditions and soil productivity are not necessarily enhanced after sagebrush eradication. Hydrologic conditions are usually the result of geological features, and sagebrush has nitrogen-fixing capabilities.

Page 2, A.5. Some subspecies of the listed target species provide valuable wildlife food and cover and should be protected. Antelope are closely associated with Artemisia tridentata ssp. wyomingensis; and A. cana is of value to some wildlife species.

Page 6. Wyoming big sagebrush stands should be protected because they are valuable for antelope and sage grouse.

Page 7. Three-tip sagebrush. Mule deer food habitat studies conducted in Idaho indicated that this plant was preferred over other sagebrush species with which it was associated. Because of this palatability and preference it should not be sprayed.

Mr. Vern Hamre, Ogden, Utah

Page 8.(2.) Affected Birds and Mammals.(b) Spring and Summer. While strutting ground is generally near-by (3-mile radius) in suitable nesting areas, in areas of poor nesting habitat this may extend to an 8-mile radius.

Page 10.(4.) Predatory Birds, paragraph 4. Removal of a sagebrush canopy would expose rodents and other dependent species to a degree of predation that, together with the loss of suitable cover, could cause their permanent removal. This, in turn, would cause predators to move to other areas.

Page 10.(b)(1) Antelope. Antelope do not switch to a diet dominated by grass. Research indicates that grass at all seasons of the year represents only minor amounts in the pronghorn's diet. In the 9,000-acre Bridger National Forest Mosquito Lake sagebrush project (1956-1959), 85 percent of the sagebrush was eradicated. In six pronghorn rumen samples collected from fall hunter kills, browse content averaged 52 percent; forbs, 44 percent; and grass, only 4 percent. In spite of the severe sagebrush eradication, 46 percent of the browse was big sagebrush.

Page 11.(2) Mule Deer. Forbs and grasses are often unavailable to deer in winter. Consequently, on a winter site, more shrubs make for a better winter range. Since the overall objective of this program is to increase grass (by decreasing brush), the end result is a loss of mule deer winter range. In any case, the increased grass forage would be consumed by livestock prior to arrival of game animals on the range. This cannot be considered beneficial to mule deer.

Page 11, last paragraph. "Animals consuming a high percentage of sagebrush in their diet may suffer from malnutrition." This is questionable. Big sagebrush is especially high in available energy in the form of fats, soluble sugars, and starches. Protein for growth and maintenance of body tissues is likewise far higher in sagebrush than in most other native winter forage, most notably in comparison to cured, weathered native grasses. This means that fewer pounds of browse would be necessary to obtain nutrient requirements than would be so if deer relied on grass.

Page 12.(5) Moose. Past projects have included moose habitat. While moose are associated with willow and aquatic areas during part of the year, they move out of these areas into selected wintering areas.

Mr. Vern Hamre, Ogden, Utah

Under Birds and Mammals, there should be some discussion of the impact of this project on the numerous small mammals and birds associated and dependent upon the sagebrush community. There should also be some evaluation of the impact on rare and endangered species associated with sagebrush and wyethia in areas of southern Idaho.

The potential effect on the aquatic environment should be evaluated. This could include overall effect on loss of streamside cover--fish protection and shade for maintaining water temperatures.

Page 13. Social and Environmental Objectives. The second paragraph seems contradictory. In one sentence, grazing grass is encouraging desirable shrubs for wildlife and, in the next sentence, herbicides can be used to remove brush to improve wildlife habitat.

Page 15, paragraph 6, last sentence. The implication is that sagebrush spraying projects are responsible for increased sage grouse populations. There is no proof of this and the sentence should be removed.

This environmental statement does not propose any monitoring activity. Such a program, limited in scope and expense, should be established in critical run-off areas to provide data to determine if such a herbicide program can be effectively continued on a yearly basis.

The draft should describe existing recreational uses of the areas to be sprayed and how these uses may be affected. The impact, if any, on public hunting opportunities and general outdoor recreation activities should be discussed. The latter could include wildlife viewing as well as interpretive programs relating to range ecology, botany, and wildlife populations.

Some comment would be in order in regard to the possibility of the proposed herbicide program being conducted in the eastern Targhee National Forest, adjacent to Yellowstone National Park, and its potential effects on the Park.

Within the area subject to the proposed program are Sawtooth National Recreation Area, Pioneer Mountains, and the "City of Rocks" in Cassia County. These are under study for possible addition to the National Park System. If herbicide applications are proposed in or around any of these areas, this should be stated and the potential effects discussed.

Mr. Vern Hamre, Ogden, Utah

The extent of adverse effects from prescribed burning may be excessive. Most of those depend entirely on temperature and relative humidity at the time of burn. Carefully planned cool burns can be efficient, economic, and slight in pollution effect. Prior to the intensive management practices, fires were a factor in maintaining plant diversity.

There is no indication that use has been made of the information developed by Mr. Ron Tabler at the Laramie Range and Experiment Station. Mr. Tabler's research indicated that sagebrush is effective in trapping snow; and, because of this, belts of sagebrush should be preserved at spacings equal to 25 times the sagebrush height.

Sincerely yours,

Secretary of the Interior

Deputy Assistant

Mr. Vern Hamre
Regional Forester
Forest Service
Department of Agriculture
324 25th Street
Ogden, Utah 84401

February 1, 1973

Mr. Vern Hamre, Regional Forester
Intermountain Region
324 25th Street
Ogden, Utah 84401

Dear Mr. Hamre:

As a member of the Idaho Environmental Council and just a concerned citizen I wish to comment on the practice of Herbicide Control of Sagebrush in Idaho and especially in the National forests in Idaho. Long before I became a member of the IEC, I have been opposed to spraying sagebrush, because I like sagebrush and the life and vegetation which grows around and among it. I think it is an important part of our western scene. Also I dislike the"dead and dying look of most of the sprayed sagebrush areas which I have seen. It seems to me that herbicide control kills not only the sagebrush, but all life around it whether it is desireable growth or not, to say nothing of the bird and animal life. I realize this spraying is done to stimulate the growth of grass, and I suppose mainly to improve forage for livestock. I assume eventually the grass does grow back in thicker stands and the once wild and natural looking area takes on the look of a quite domestic looking cow pasture, which surely detracts greatly from the esthetic value of the area as in my estimation.

Most of the natural sagebrush areas which I have observed in ... Idaho has considerable grass as well as wild flowers and other vegetation (not noxious weeds) along with the sagebrush unless it has been overgrazed, and then there are areas which were plowed at some earlier date and allowed to return to natural growth which are not the same as the original natural growth either.

It seems to me that spraying to increase forage is maximizing one use and making an irreversible change. In this age of fast vanishing natural and native or wild land is this the best use of these natural areas? In my opinion much of the good fertile farmland which lies idle in soil bank should be used for additional grazing.

I feel the same way about spraying sagebrush on BLM land for the most part. I read recently where some states were returning sagebrush desert areas to much improved stands of grass by simply reducing and rotating grazing on these areas.

I realize the Forest Service and other land management officials have a great responsibility in making decisions and regulations on the ever increasing demands and uses of public lands and forests, and they are certainly to be commended for their past and present efforts. I hope every effort will be made in the future by the people of our country to base the ecomomy of our nation on the land we have already cultivated, settled, and built upon, and wherever possible preserve what natural and wild land we have left.

I appreciate this opportunity to comment and voice my opinion.

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Sincerely,

END

DATE

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4-7-73

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